

THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

JAPAN IN MANCHURIA

By GEORGE BRONSON REA

DAYLIGHT IN THE PHILIP- PINES

OUT OF KIMONO INTO OVERALL

By MAURICE HOLLAND

THE FORGOTTEN THIRD PRINCIPLE OF DR. SUN YAT-SEN

AMERICA'S DUTY TOWARDS CHINA

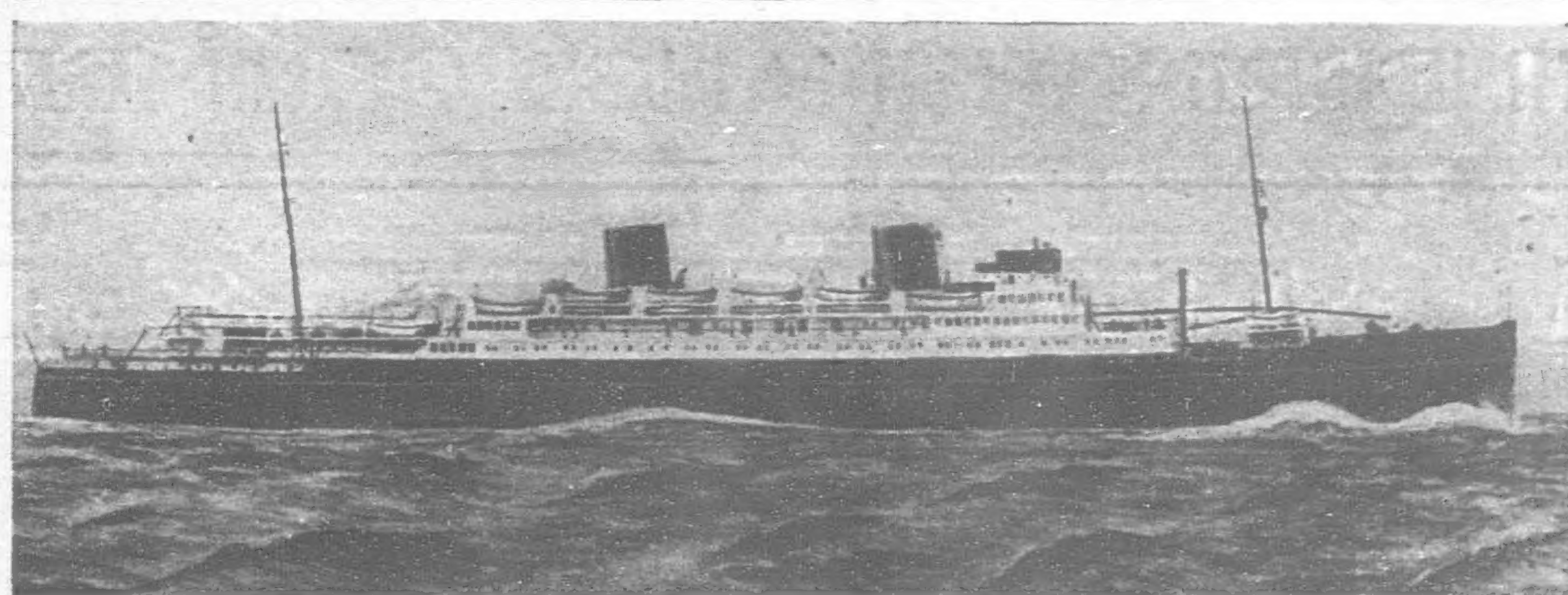
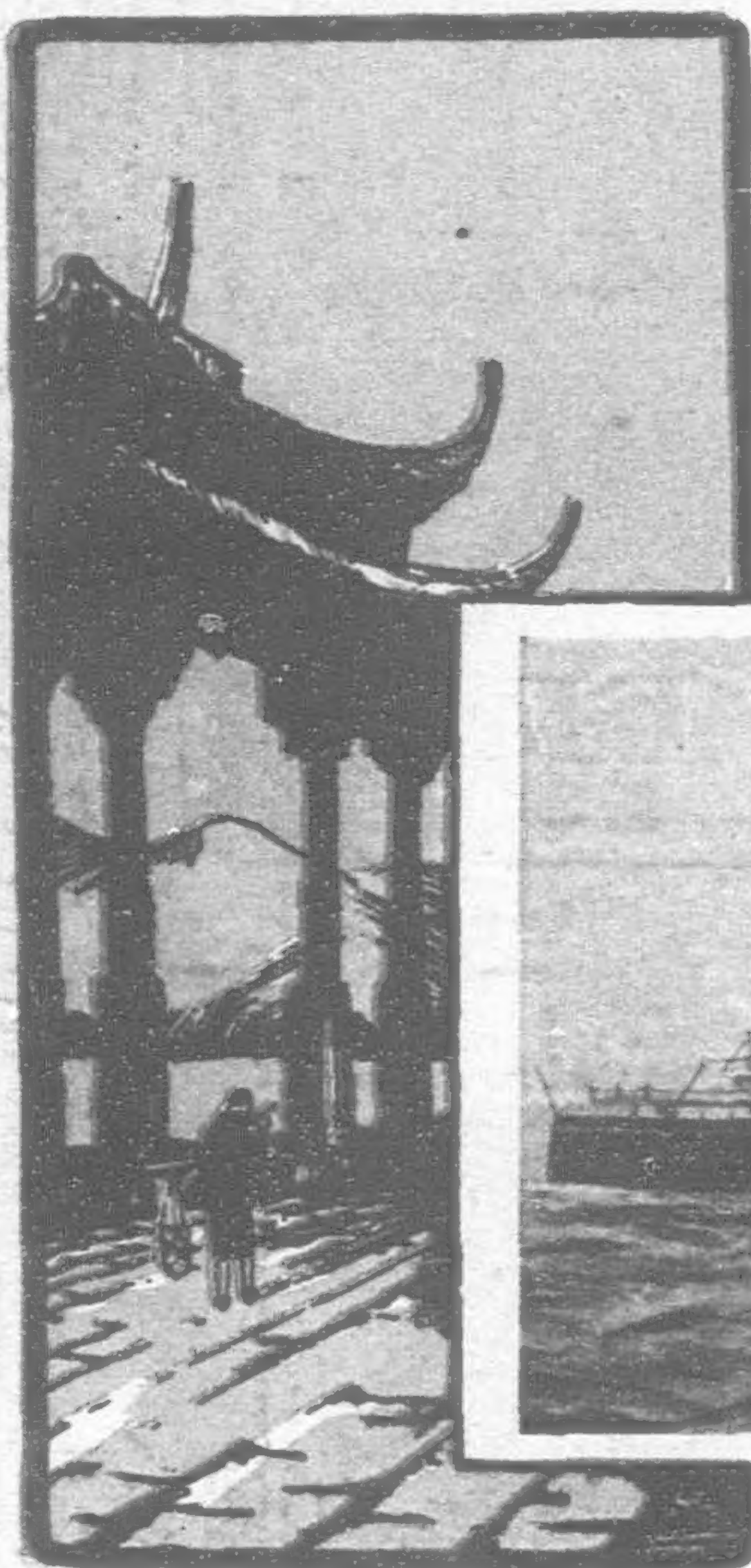
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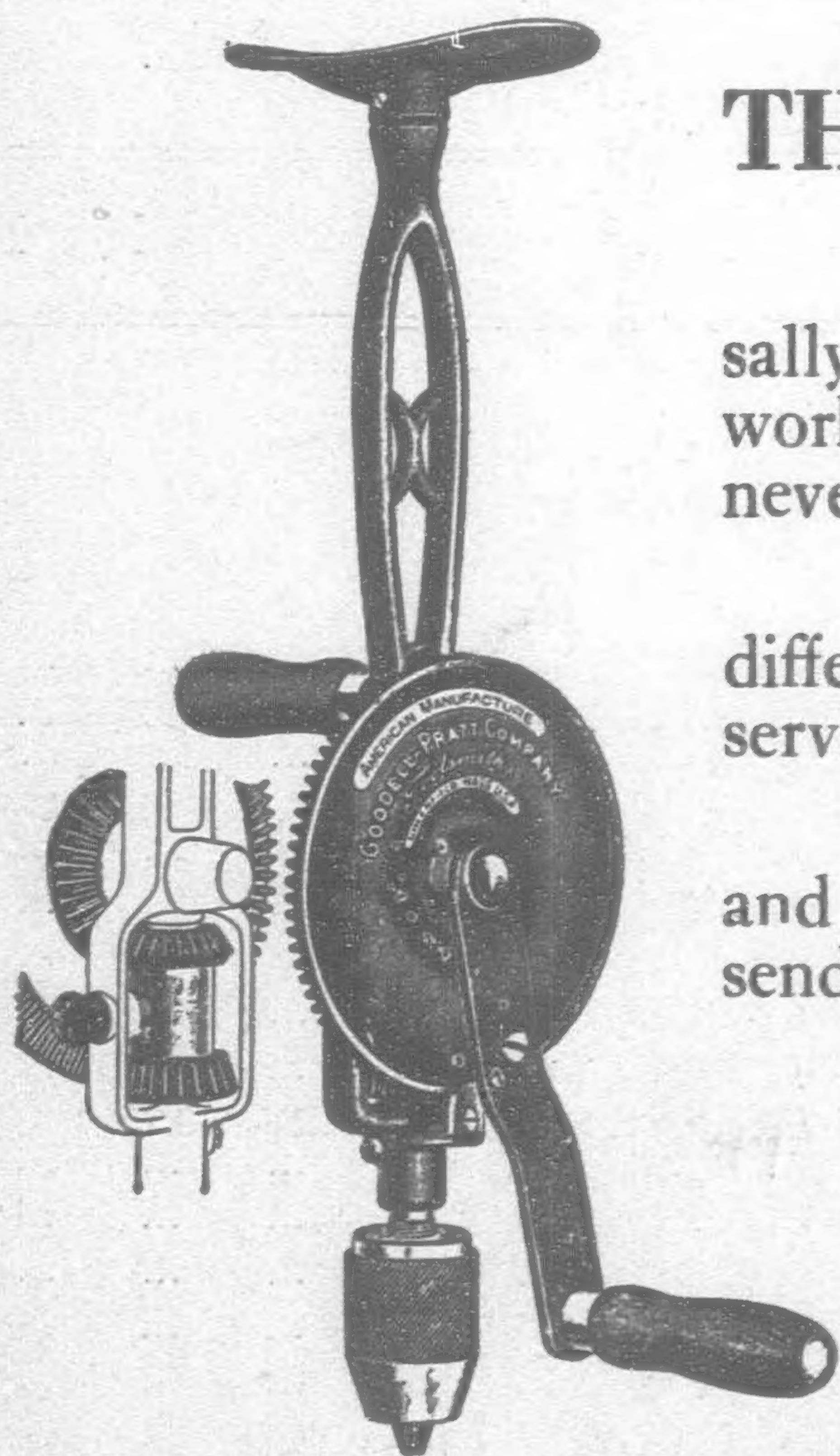
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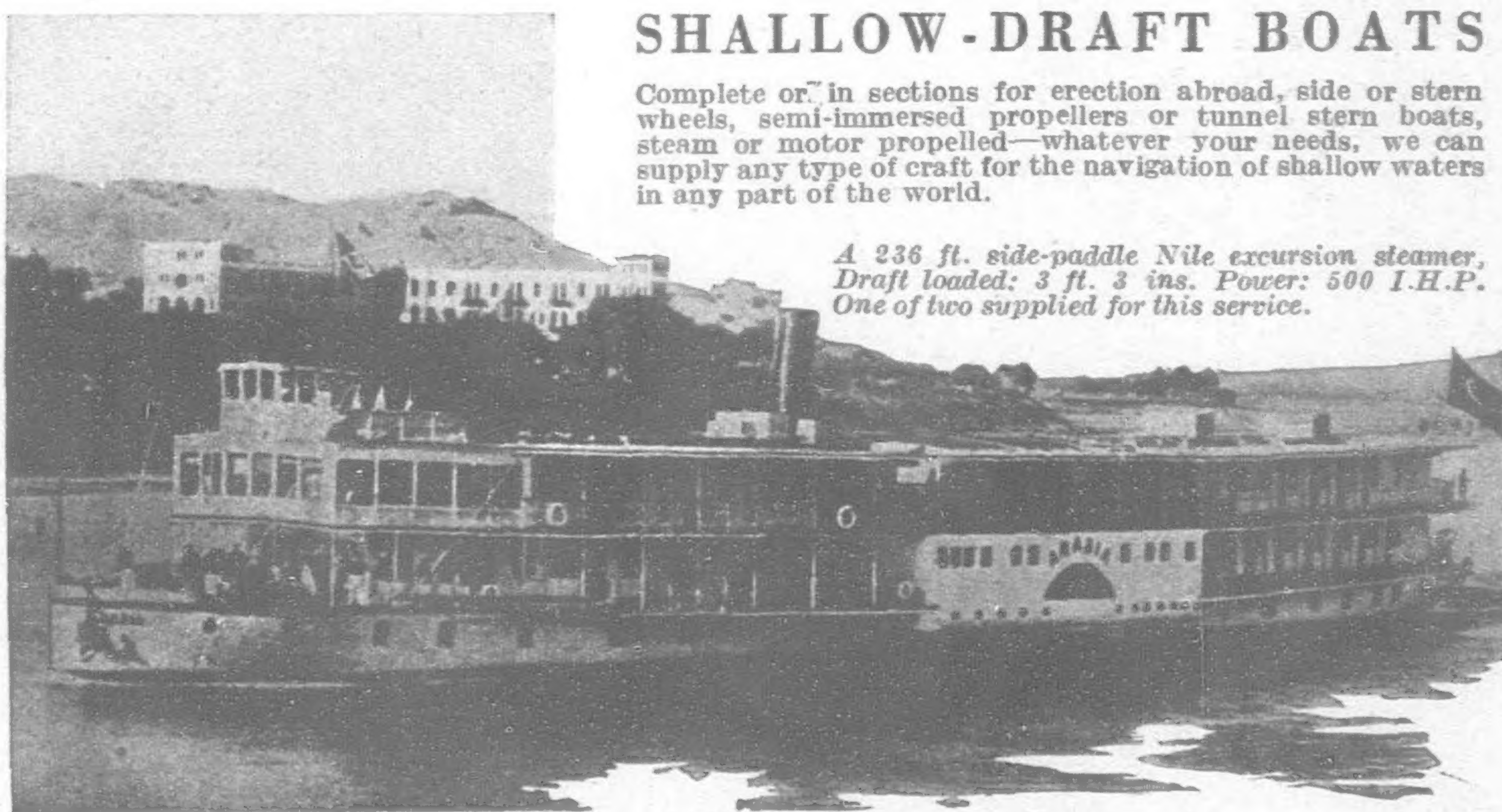
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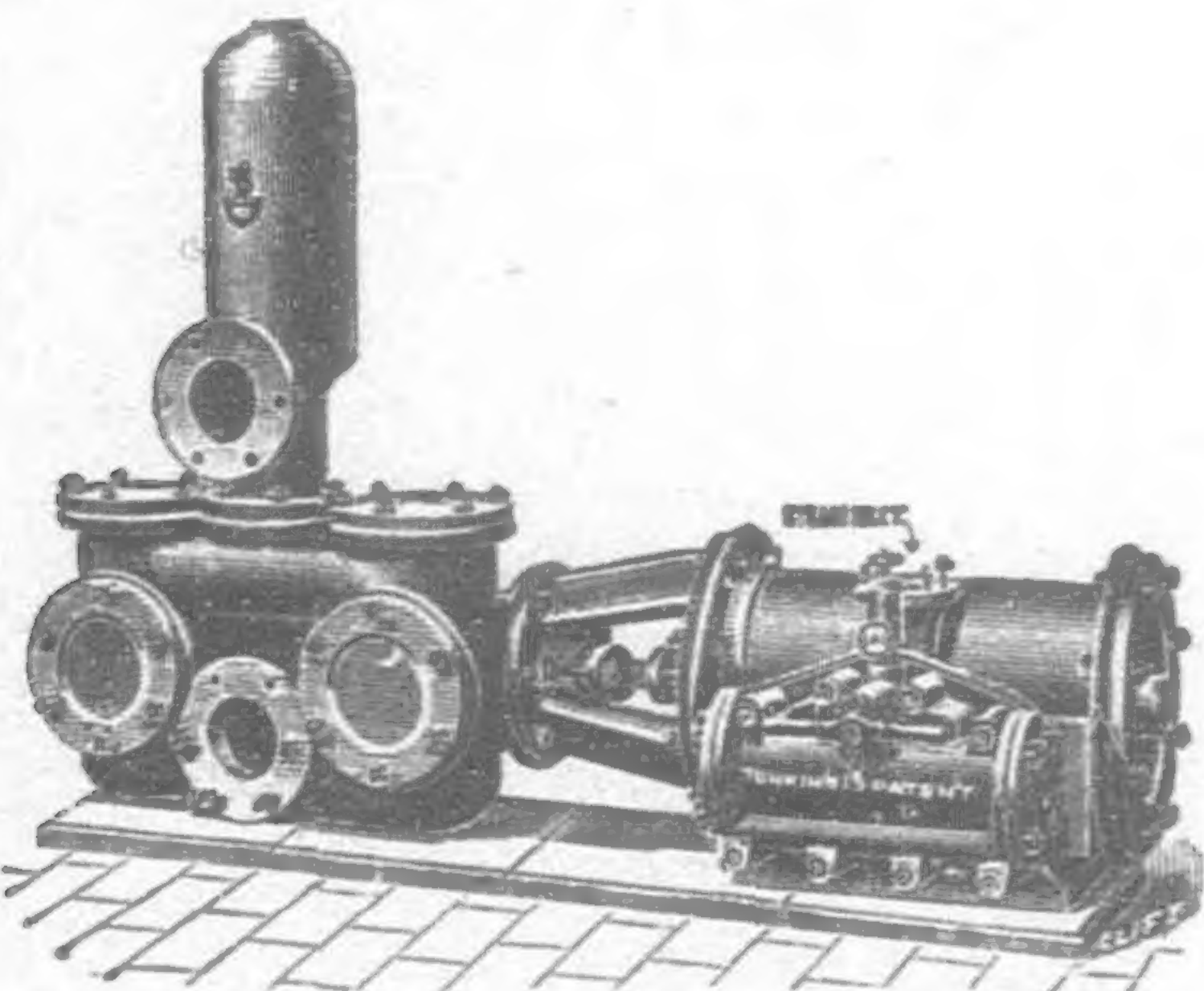
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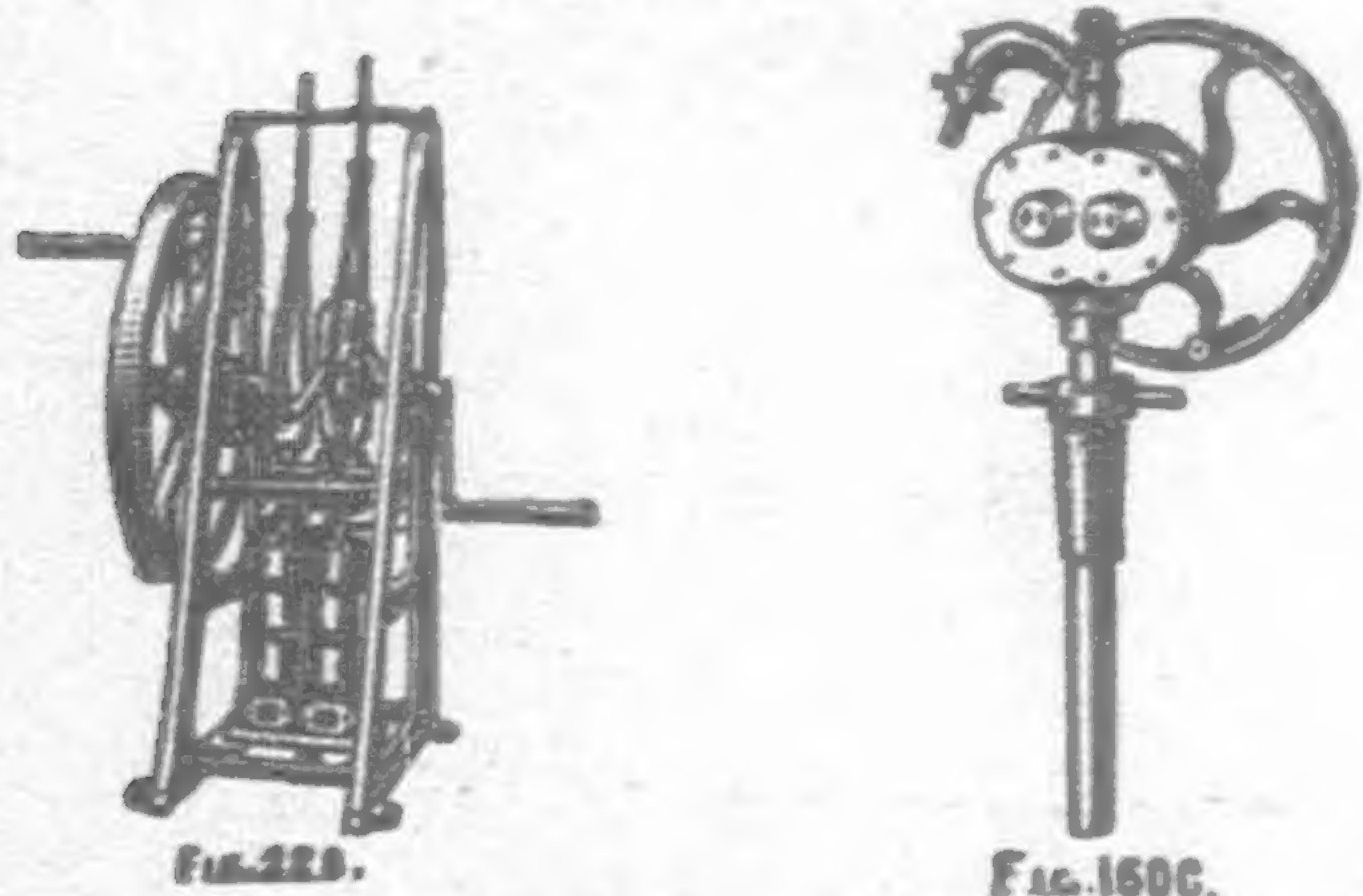


Fig. 228.

Fig. 1606.

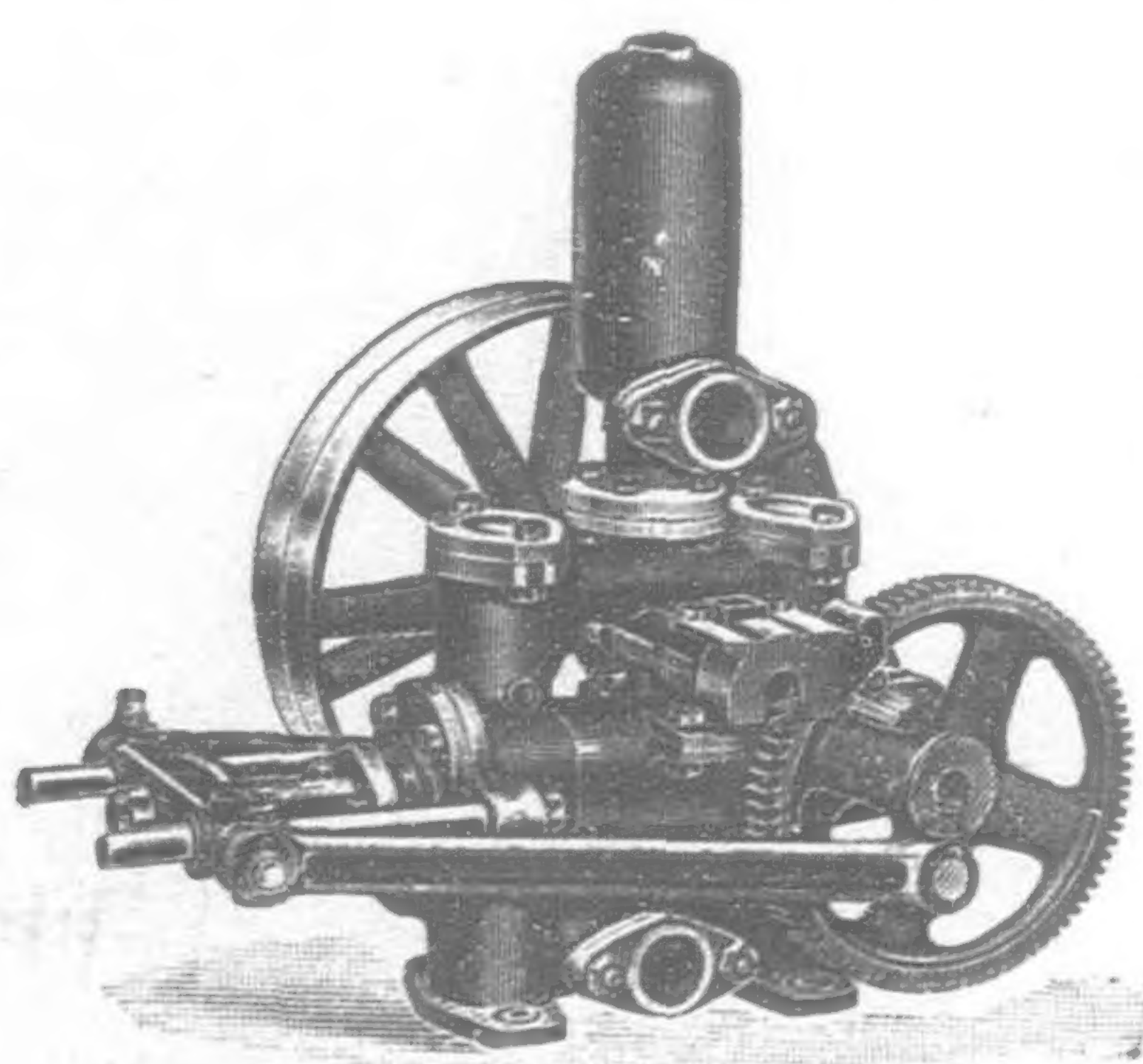
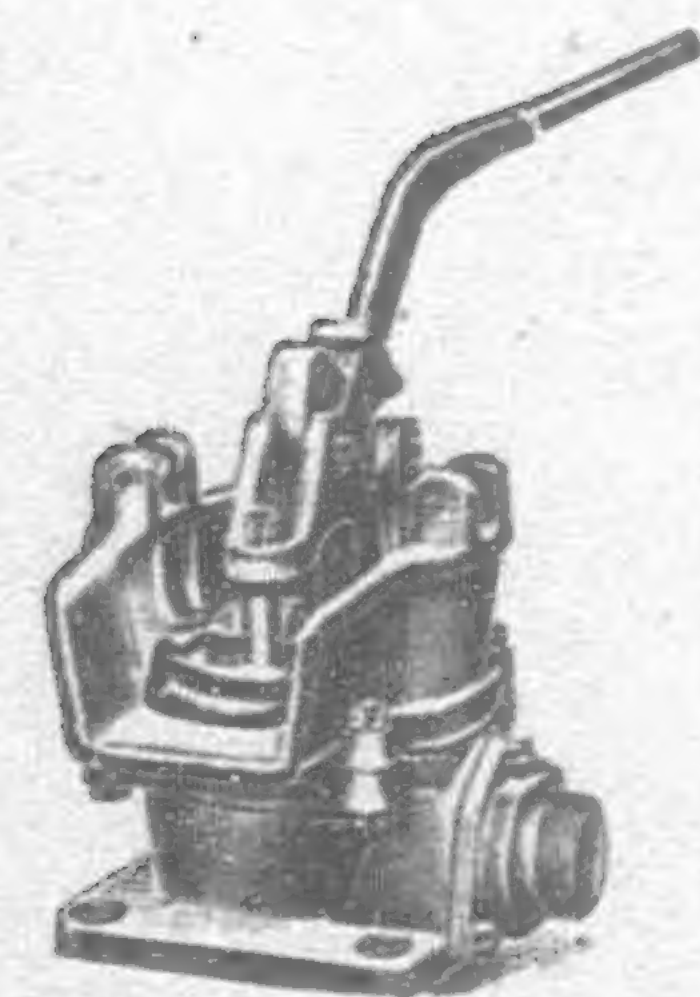
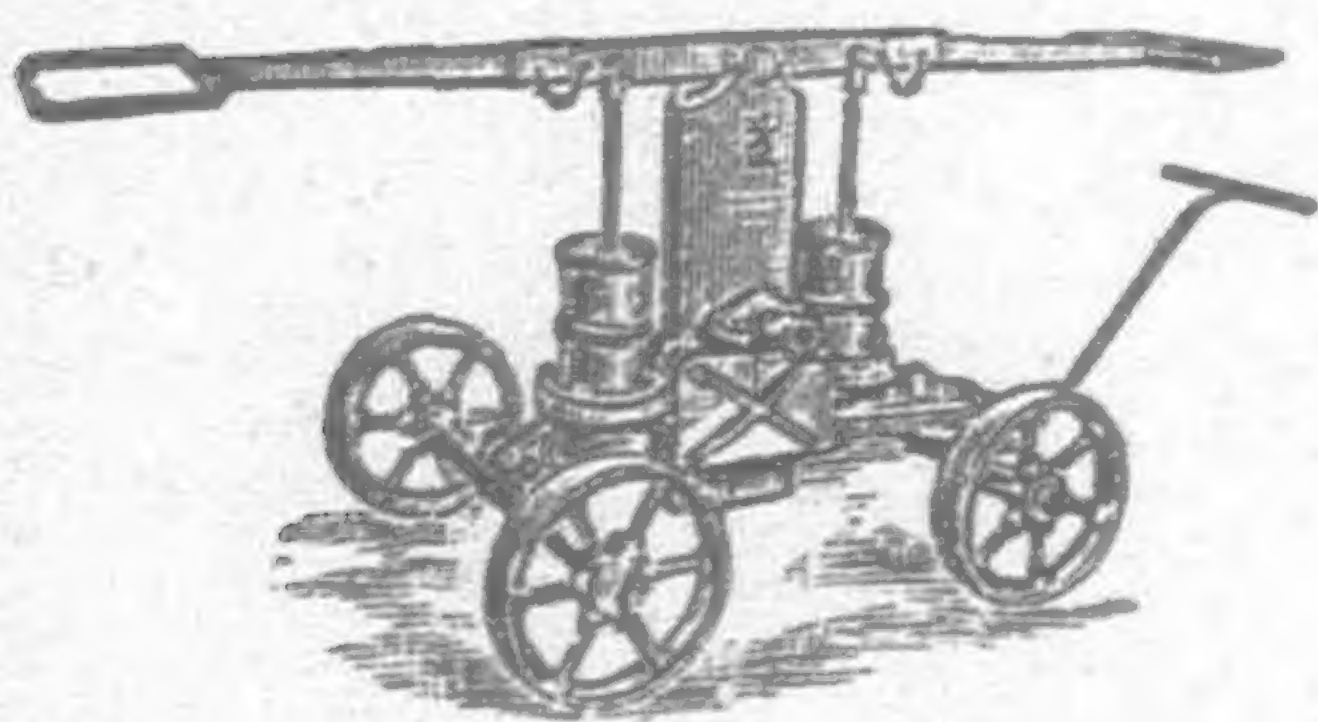


Fig. 831—Double Acting Belt Driven Pump

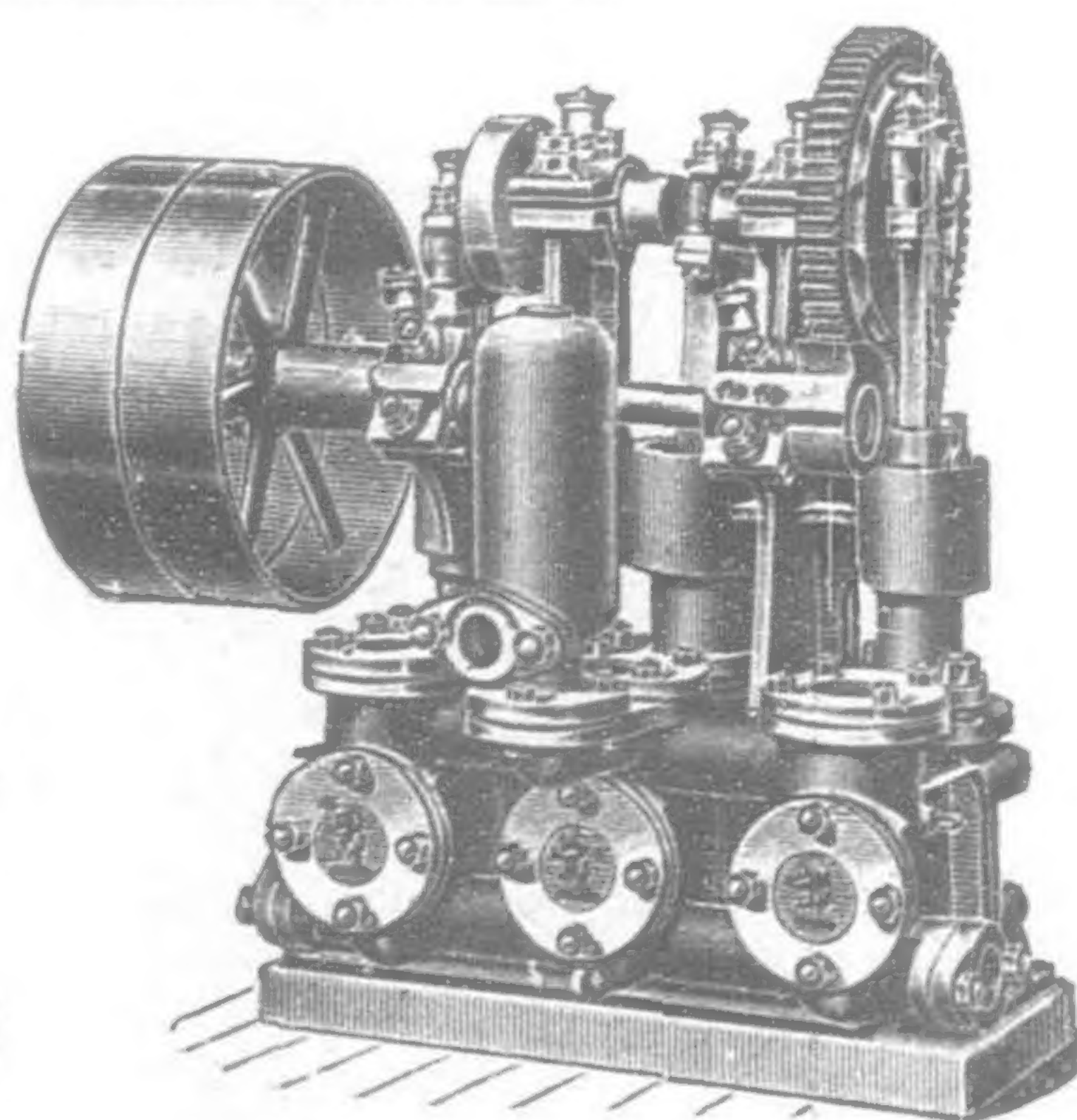
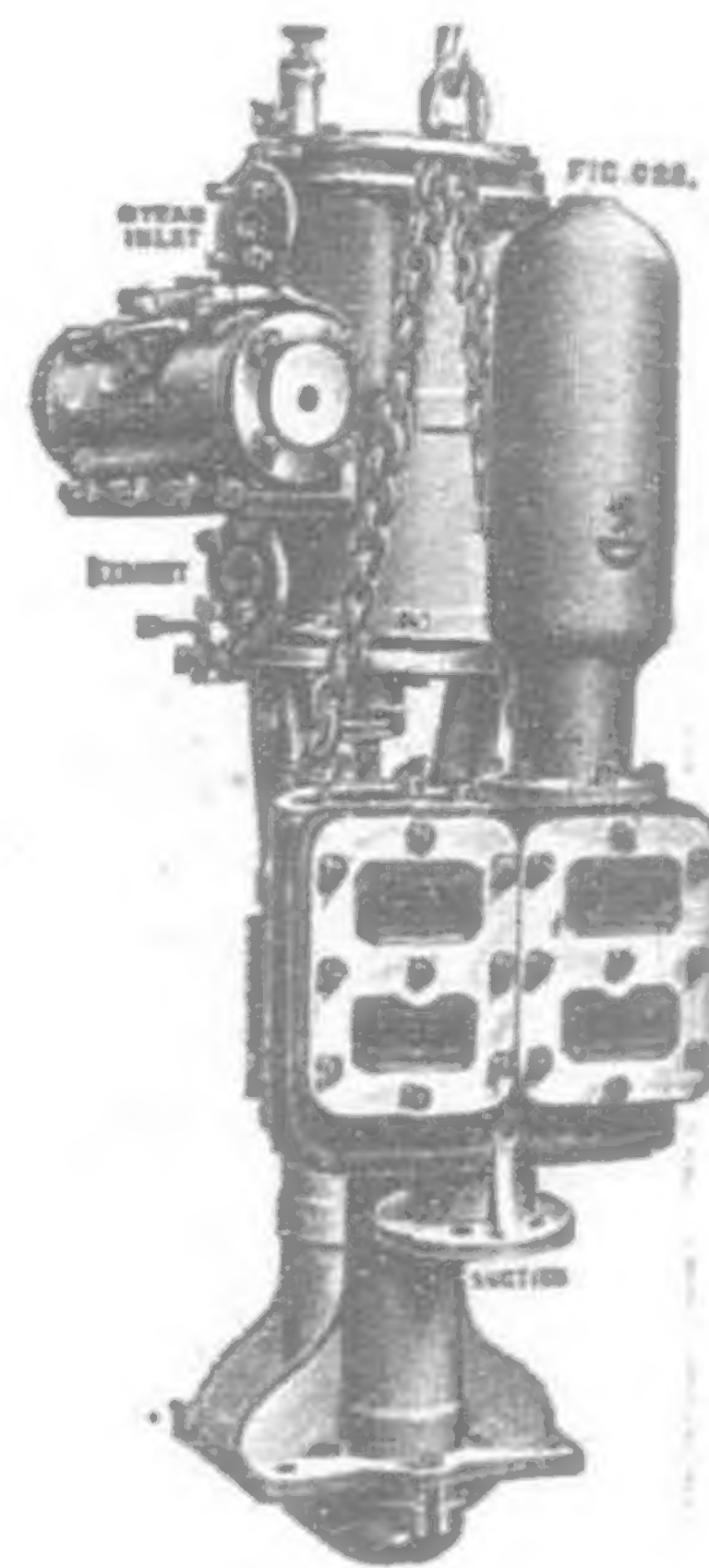


Fig. 842—Treble Ram Pump for Belt or Electric Drive



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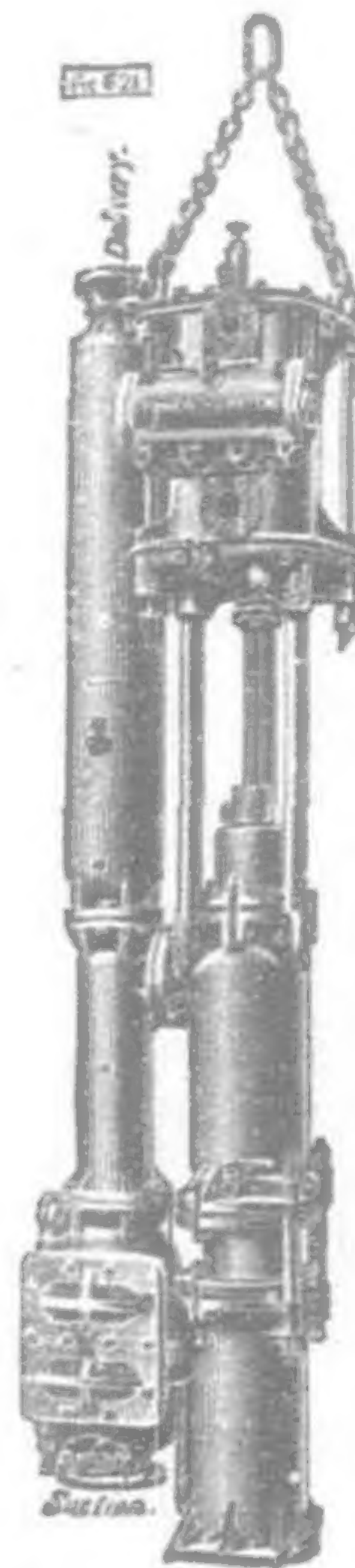


Fig. 191.

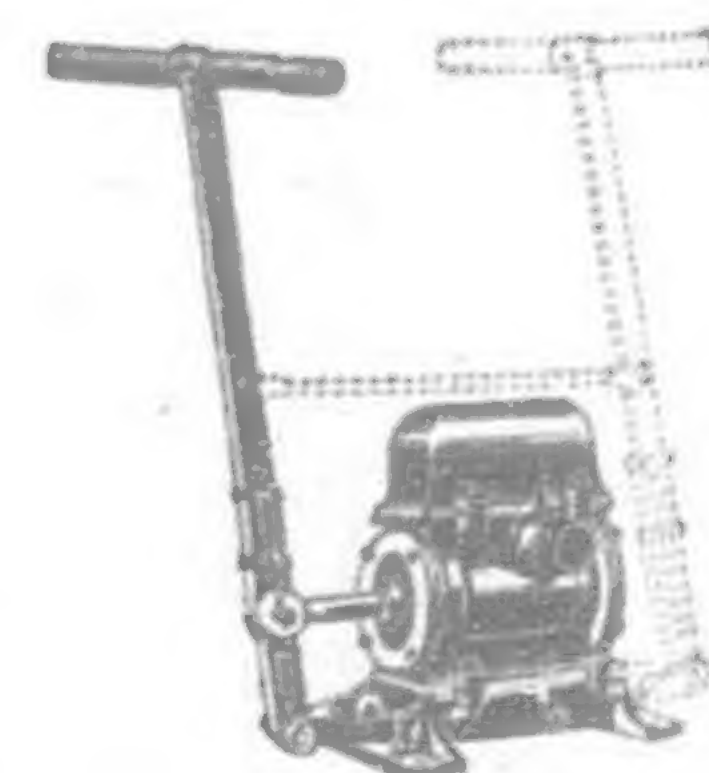


Fig. 185.

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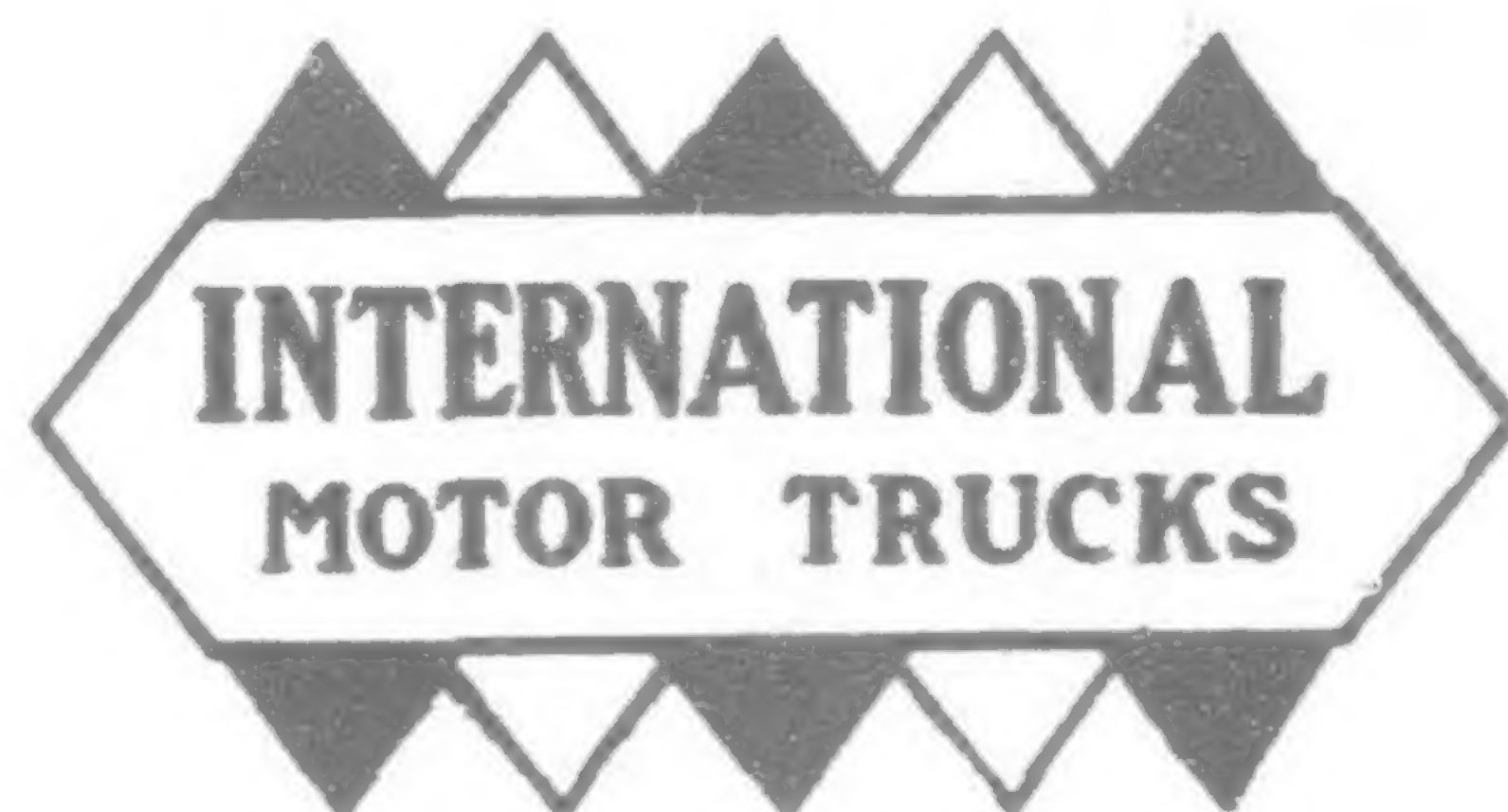
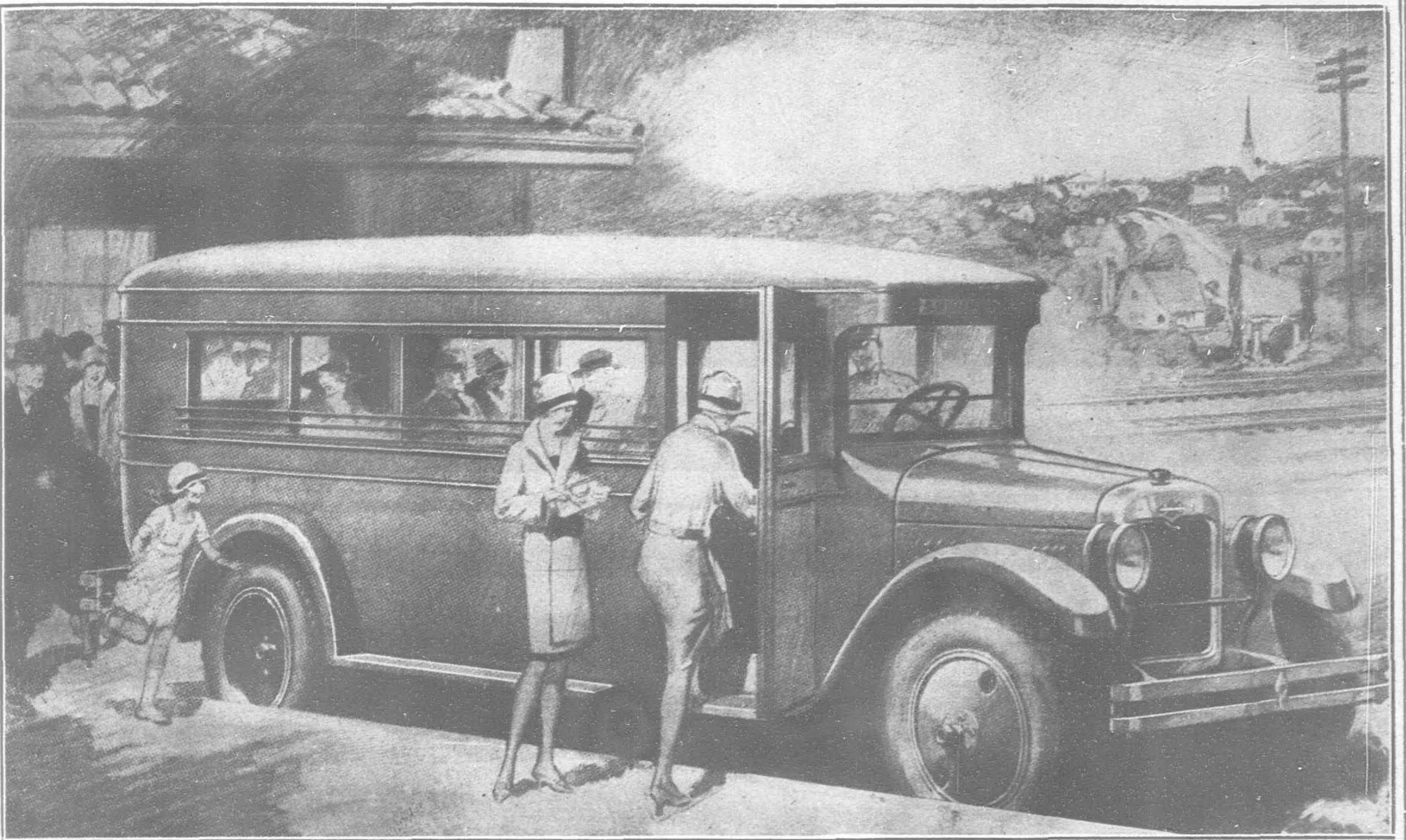
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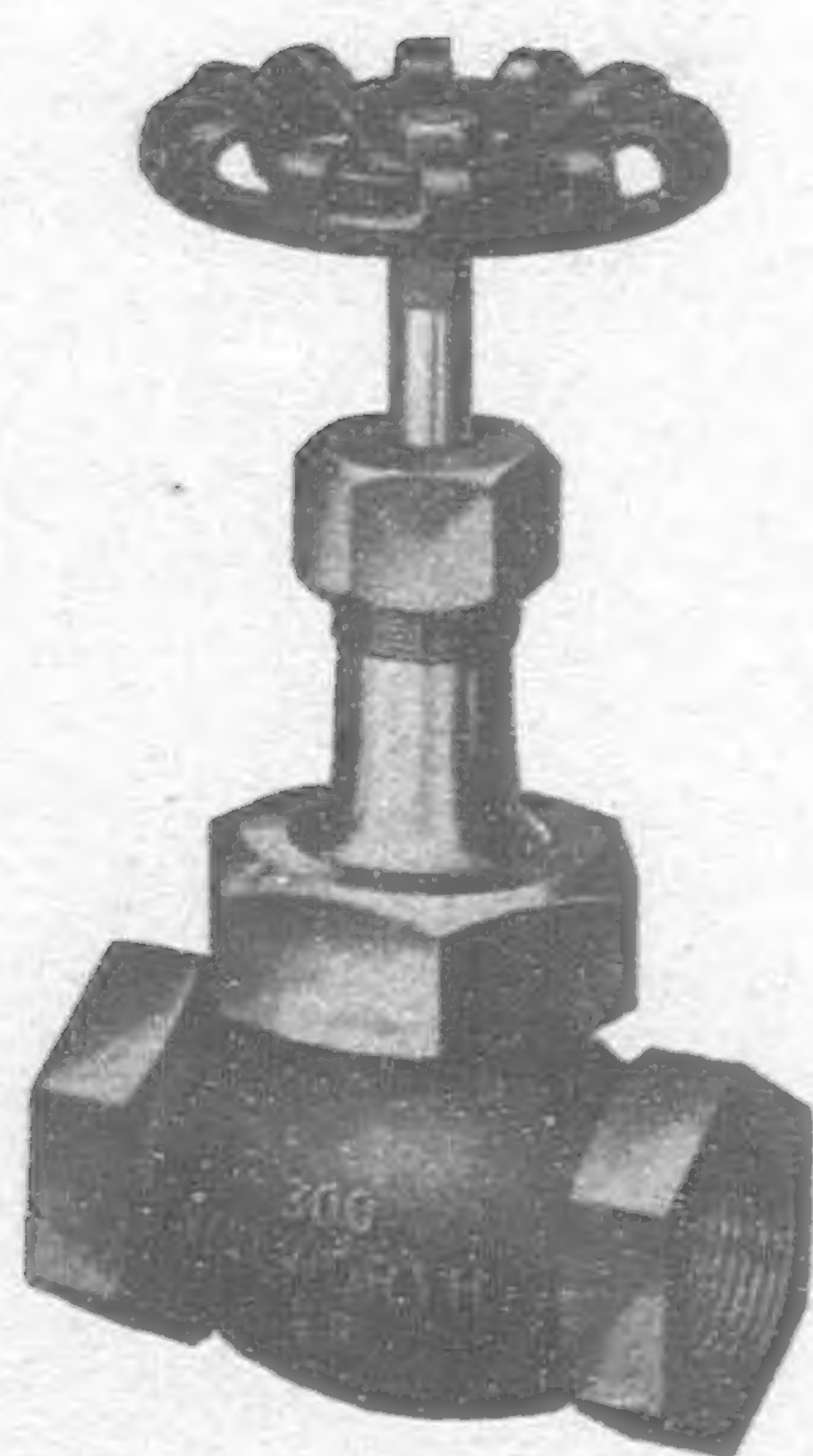
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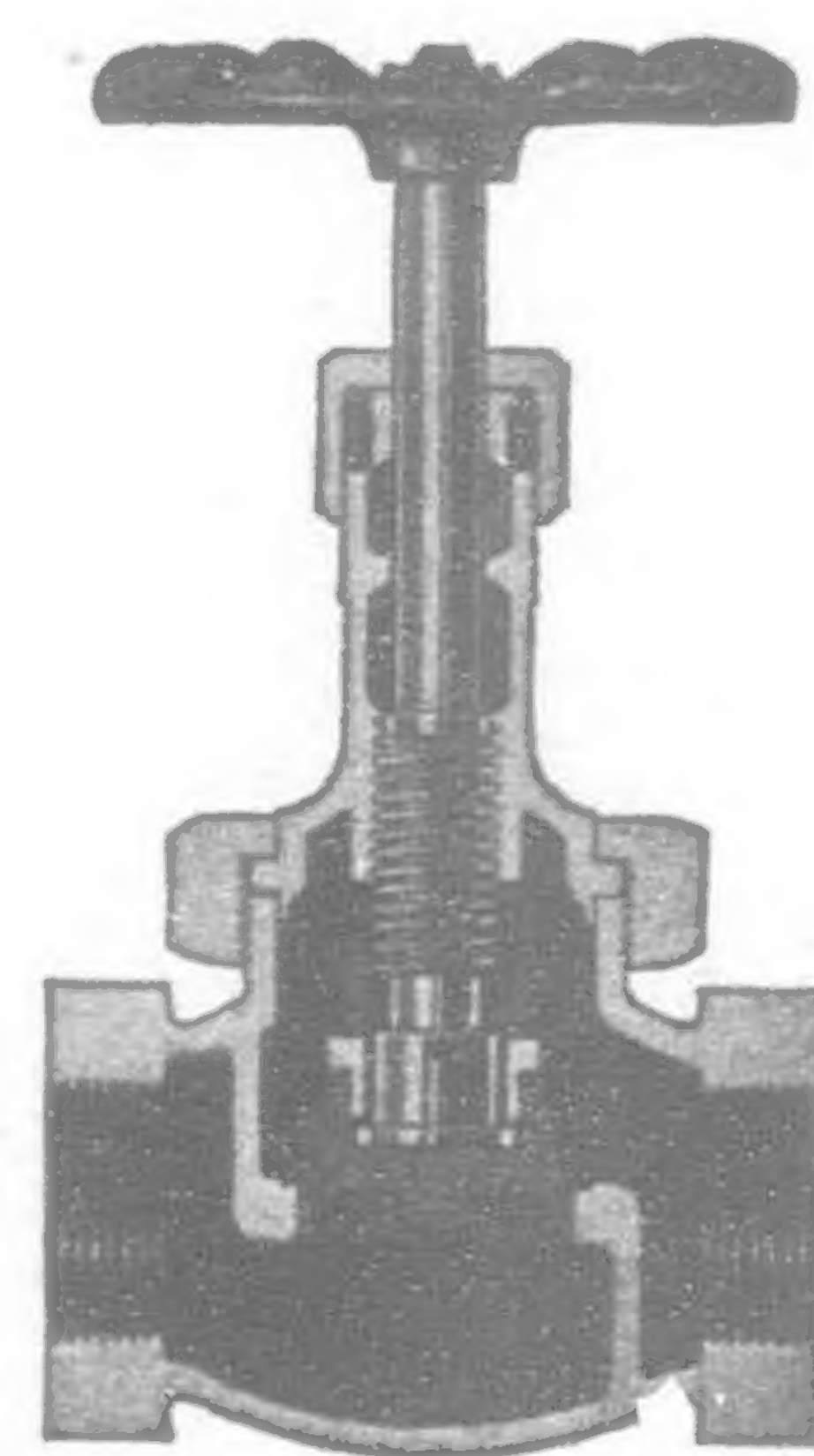
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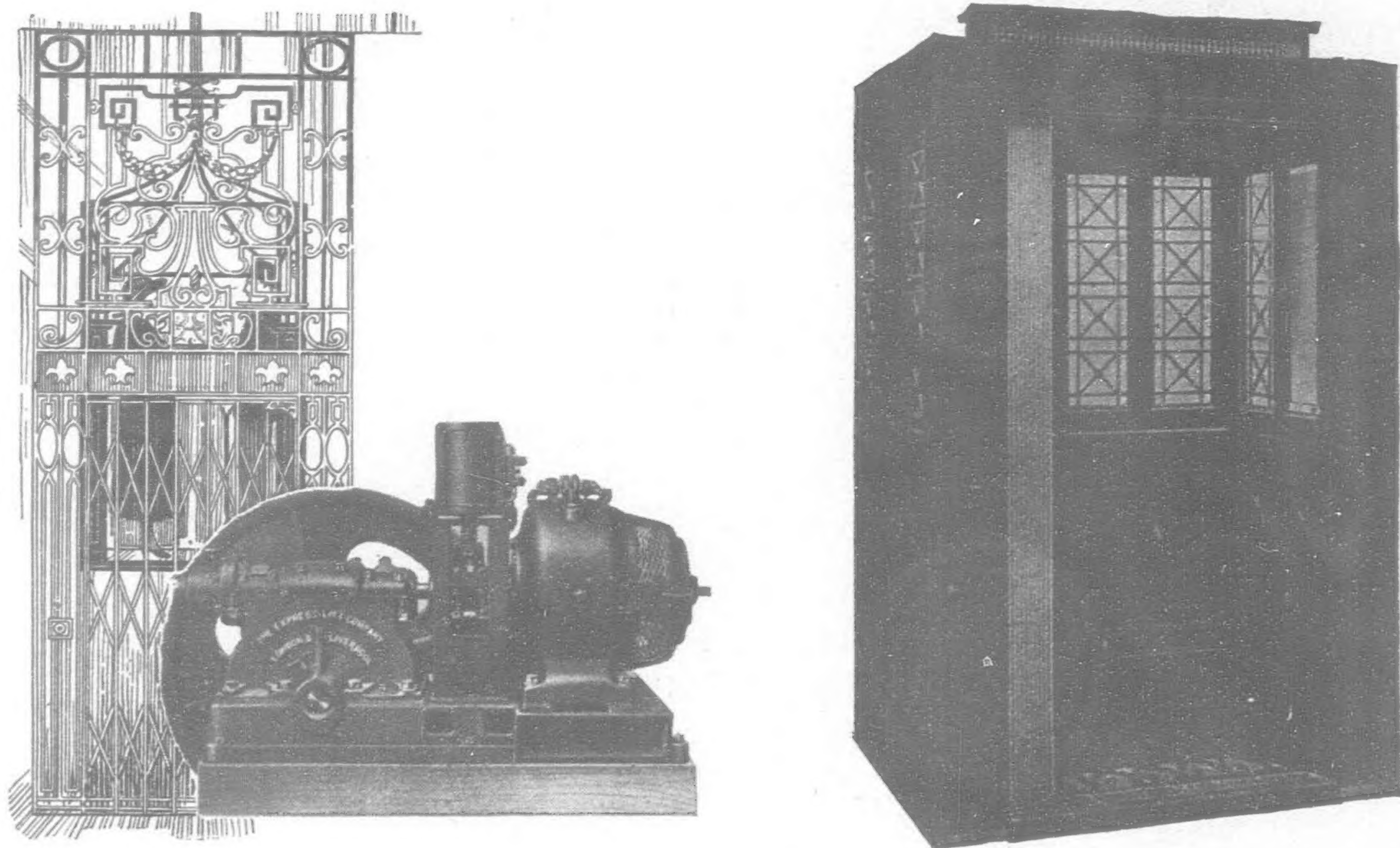


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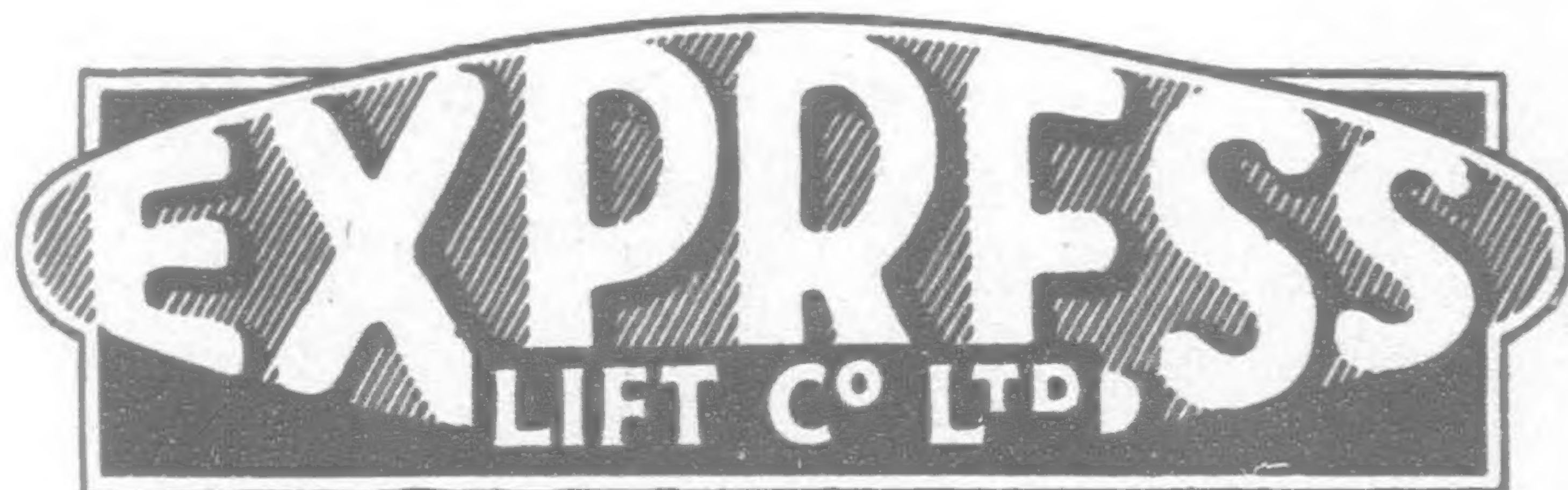
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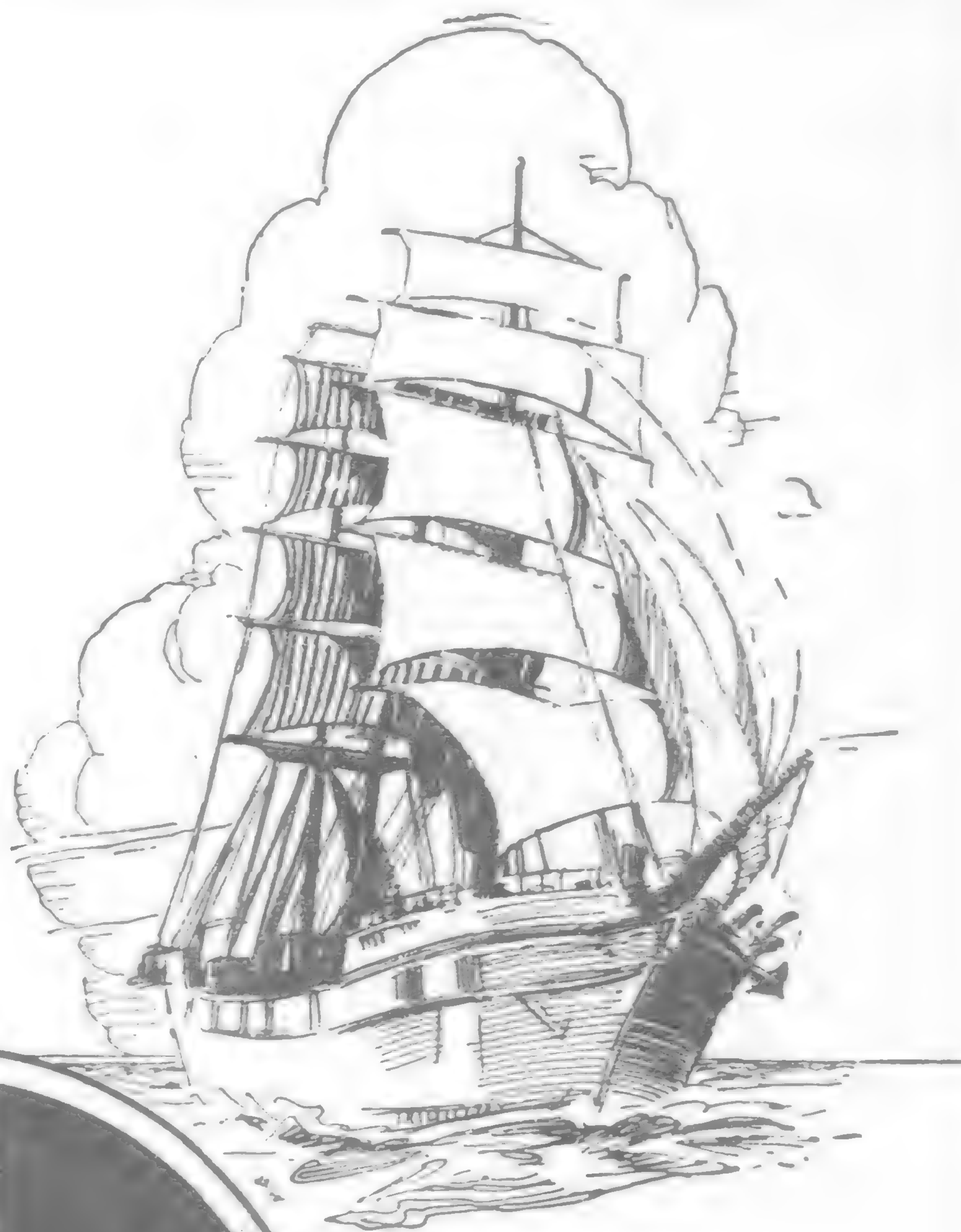
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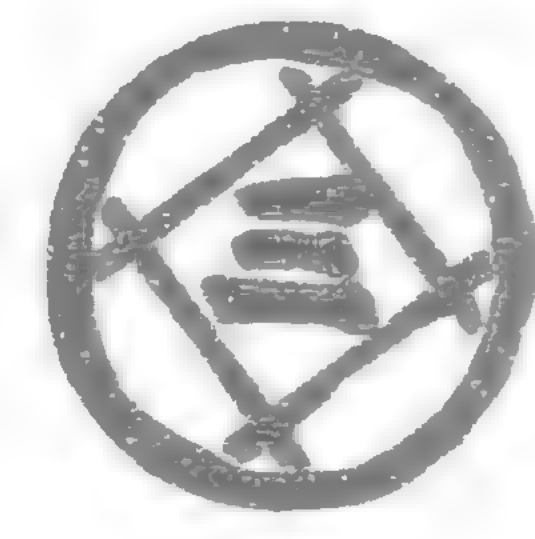
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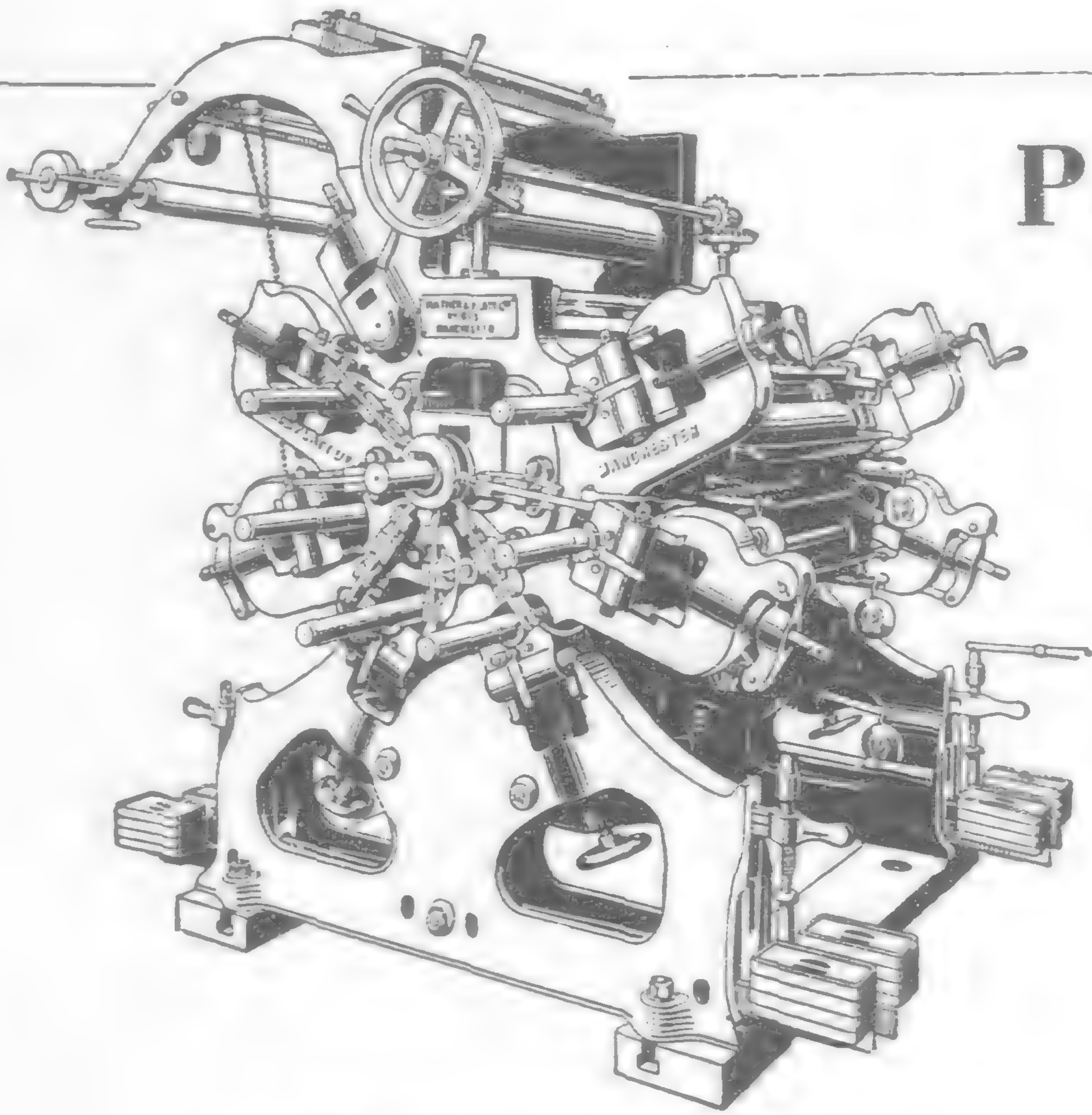
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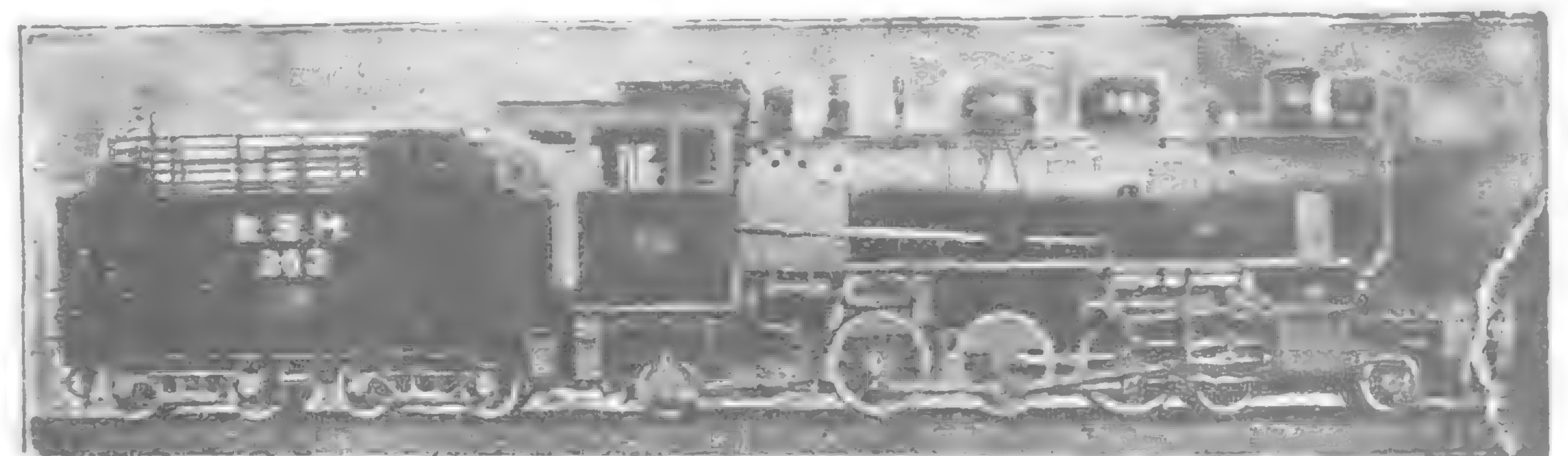
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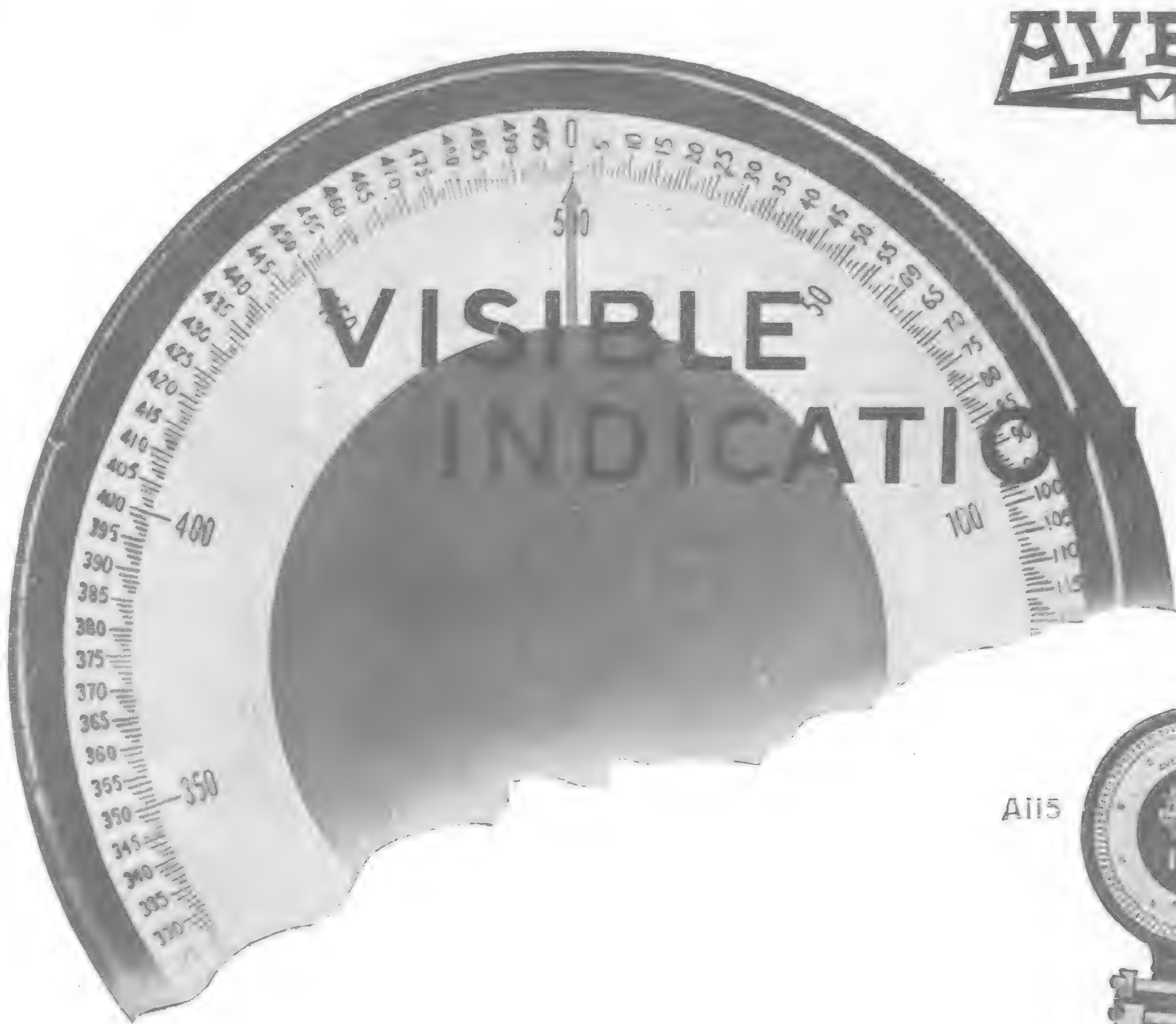
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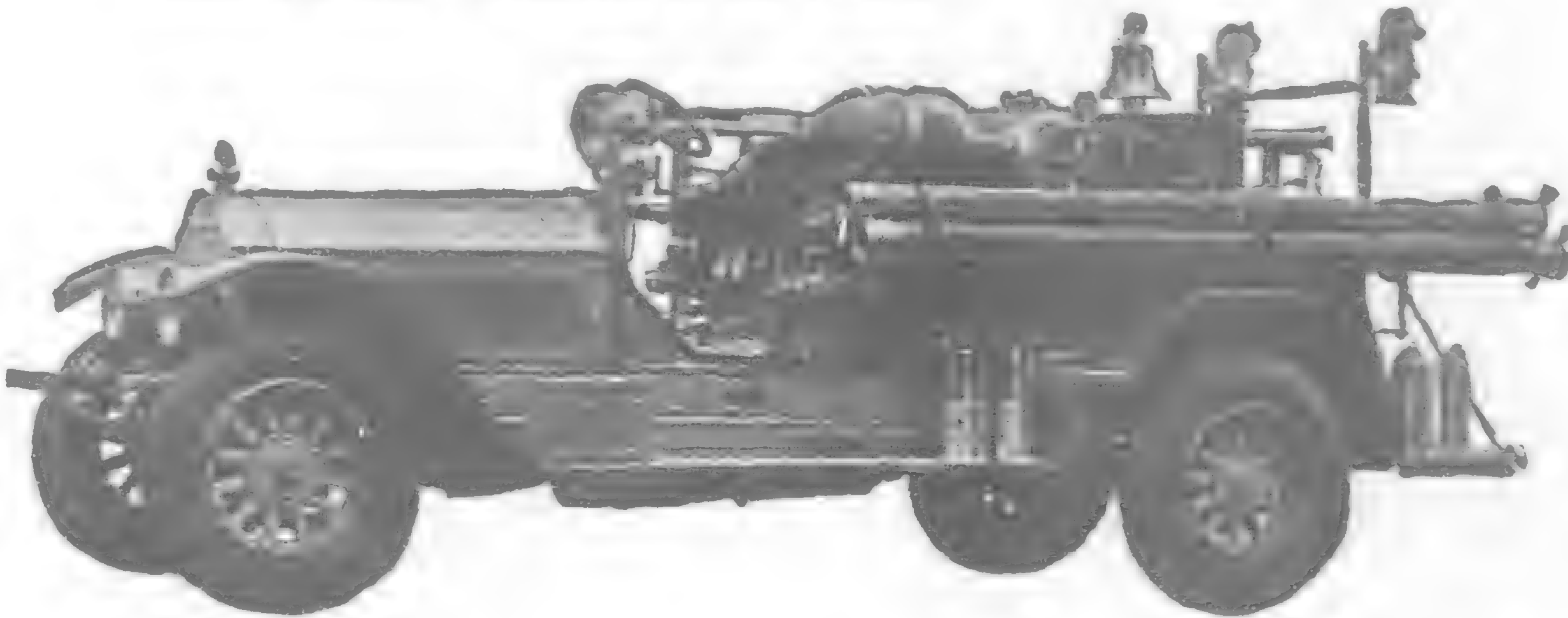


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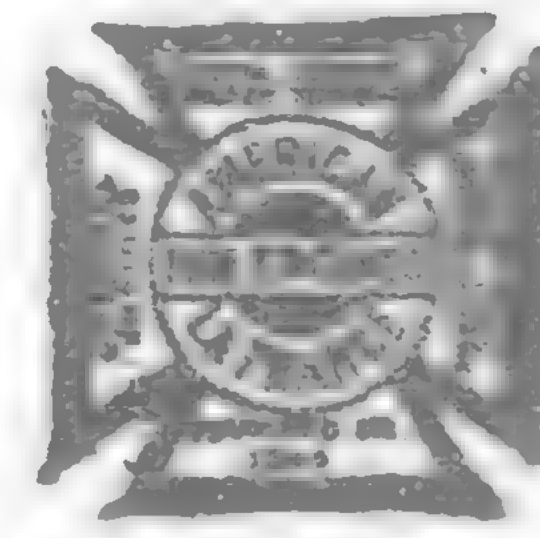
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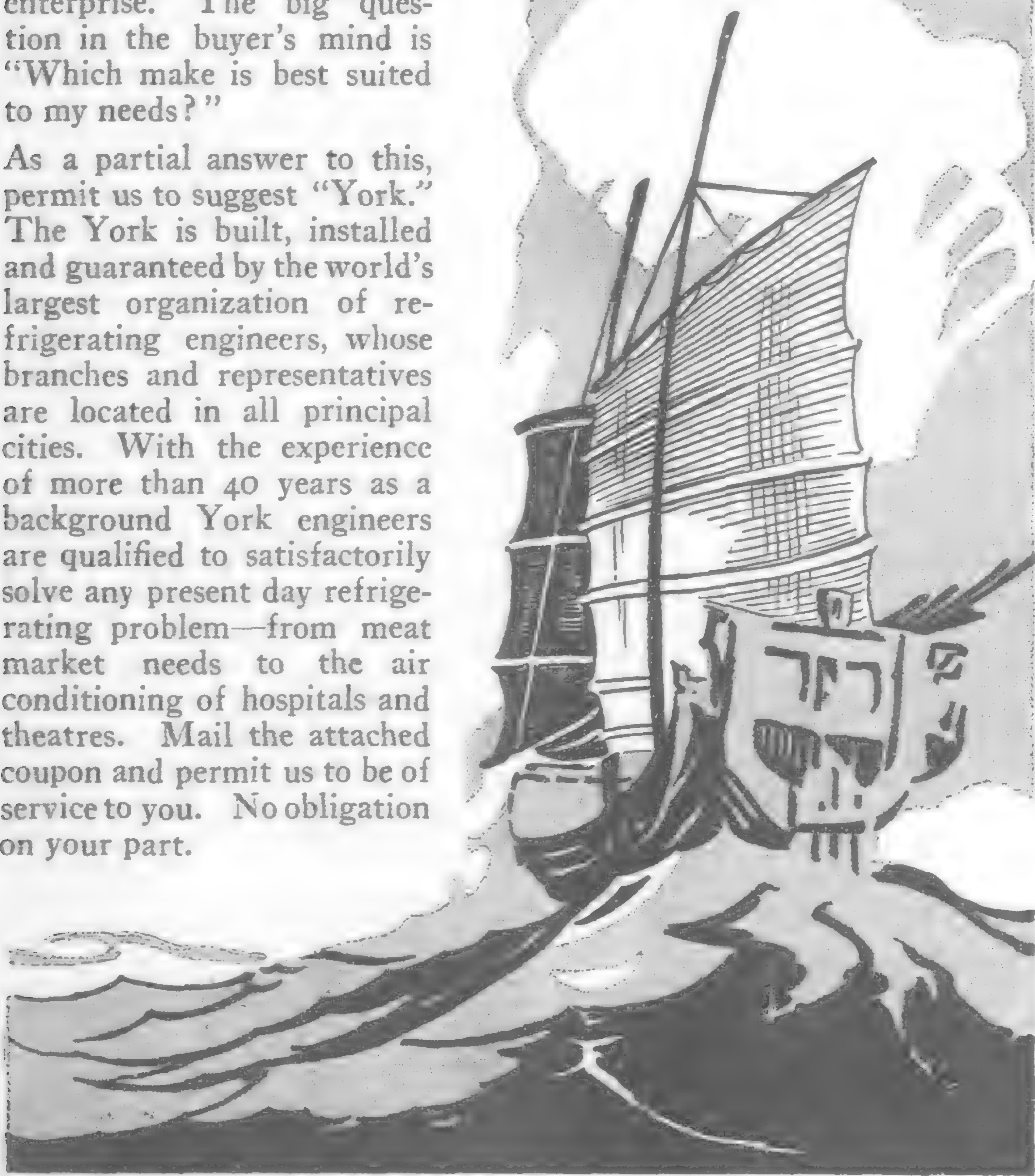
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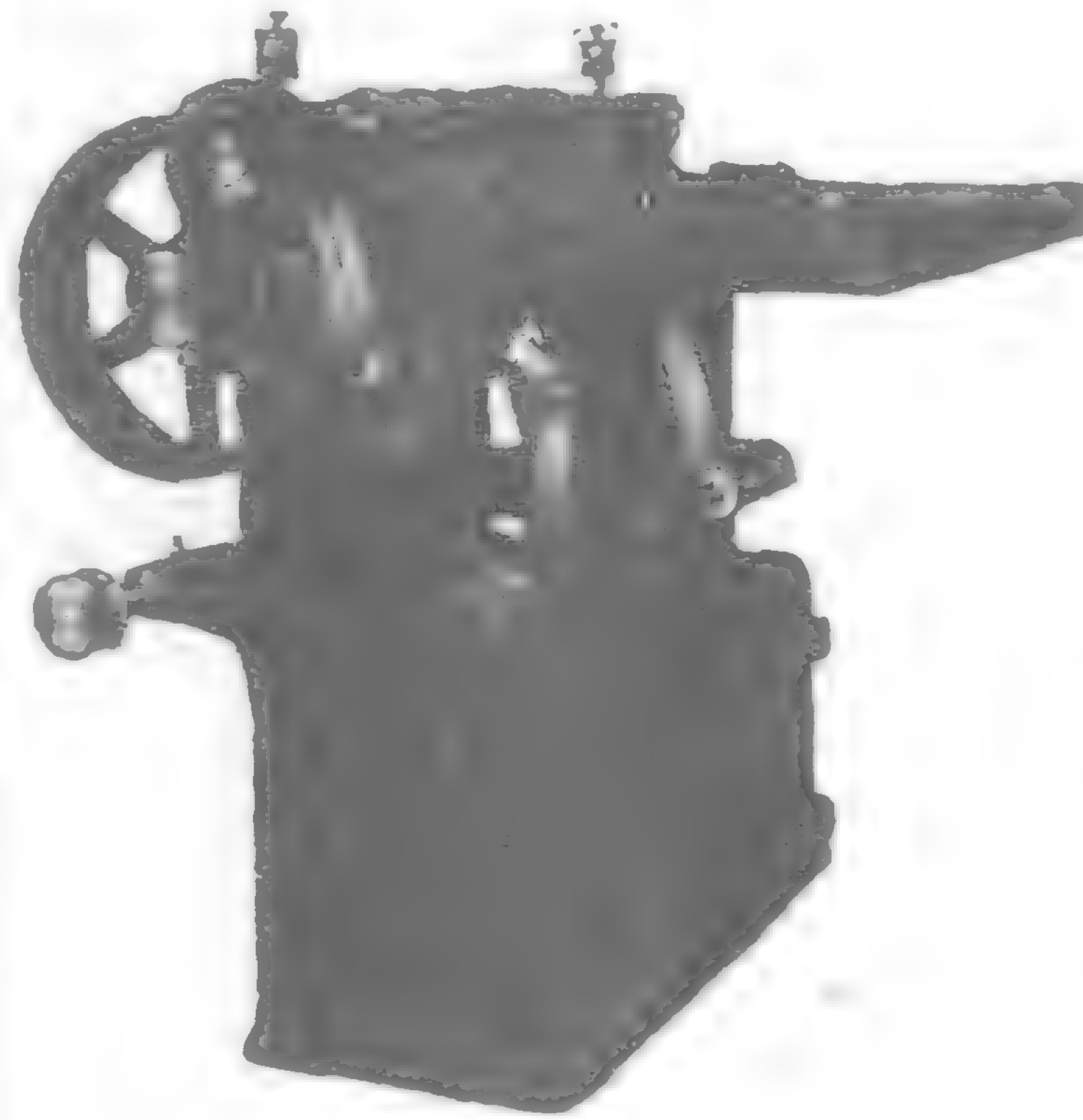
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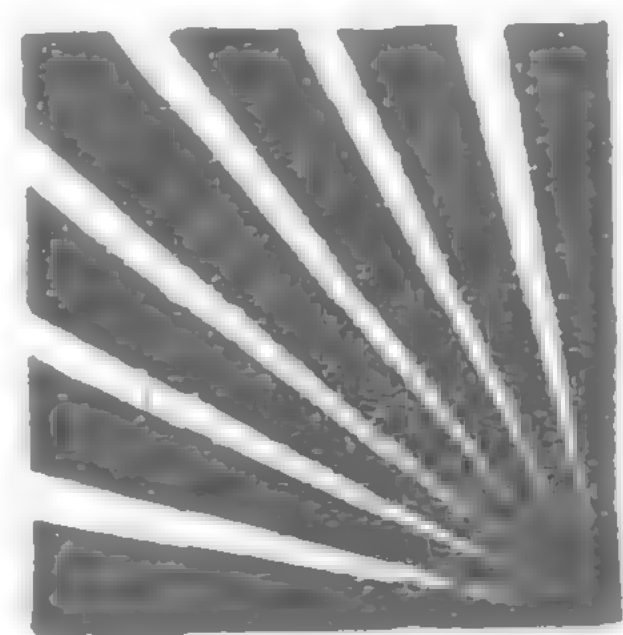
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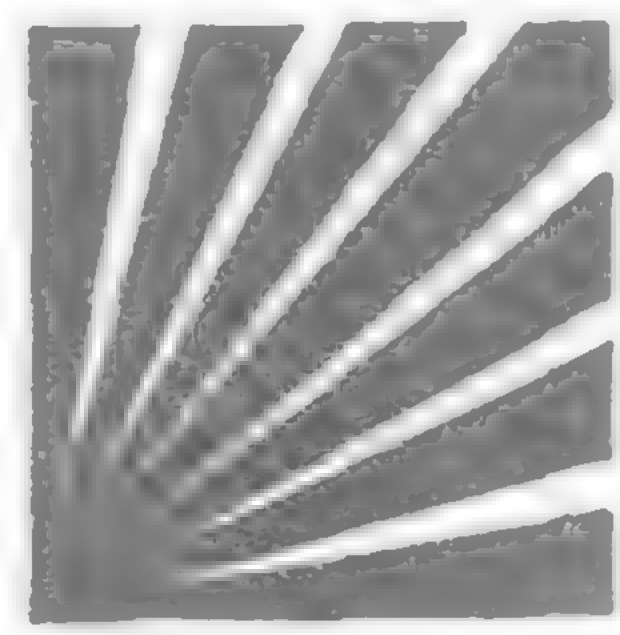
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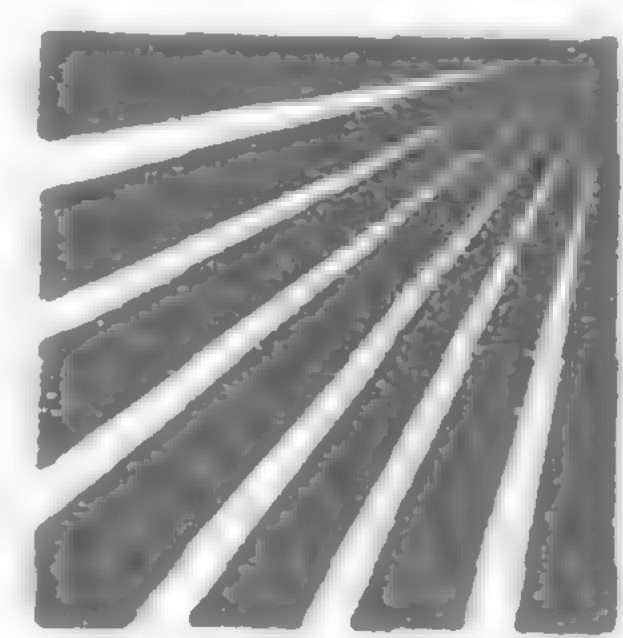
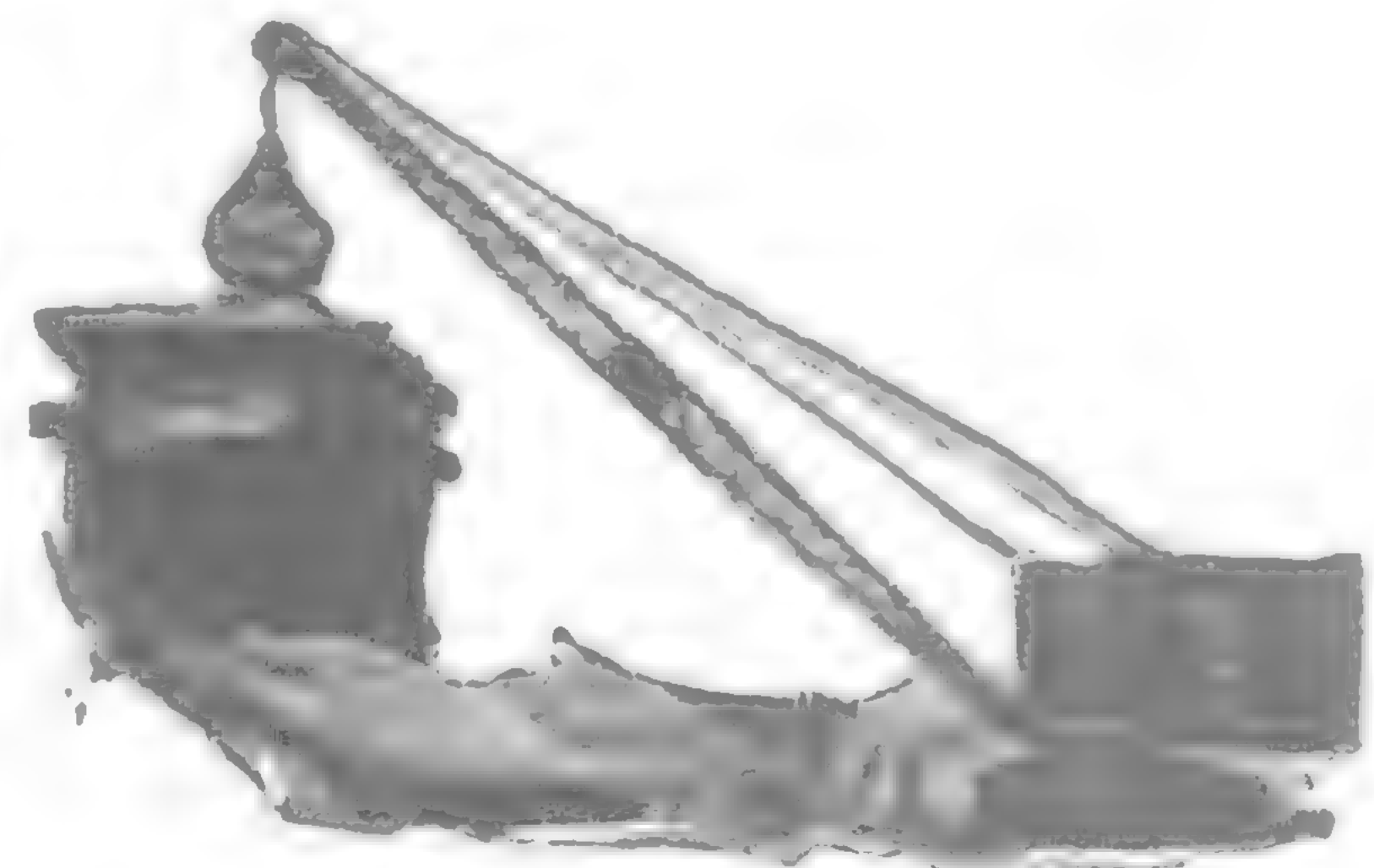
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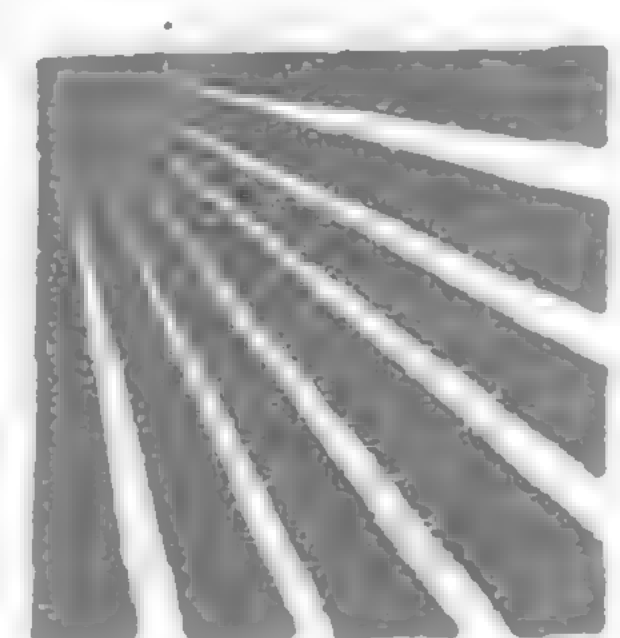
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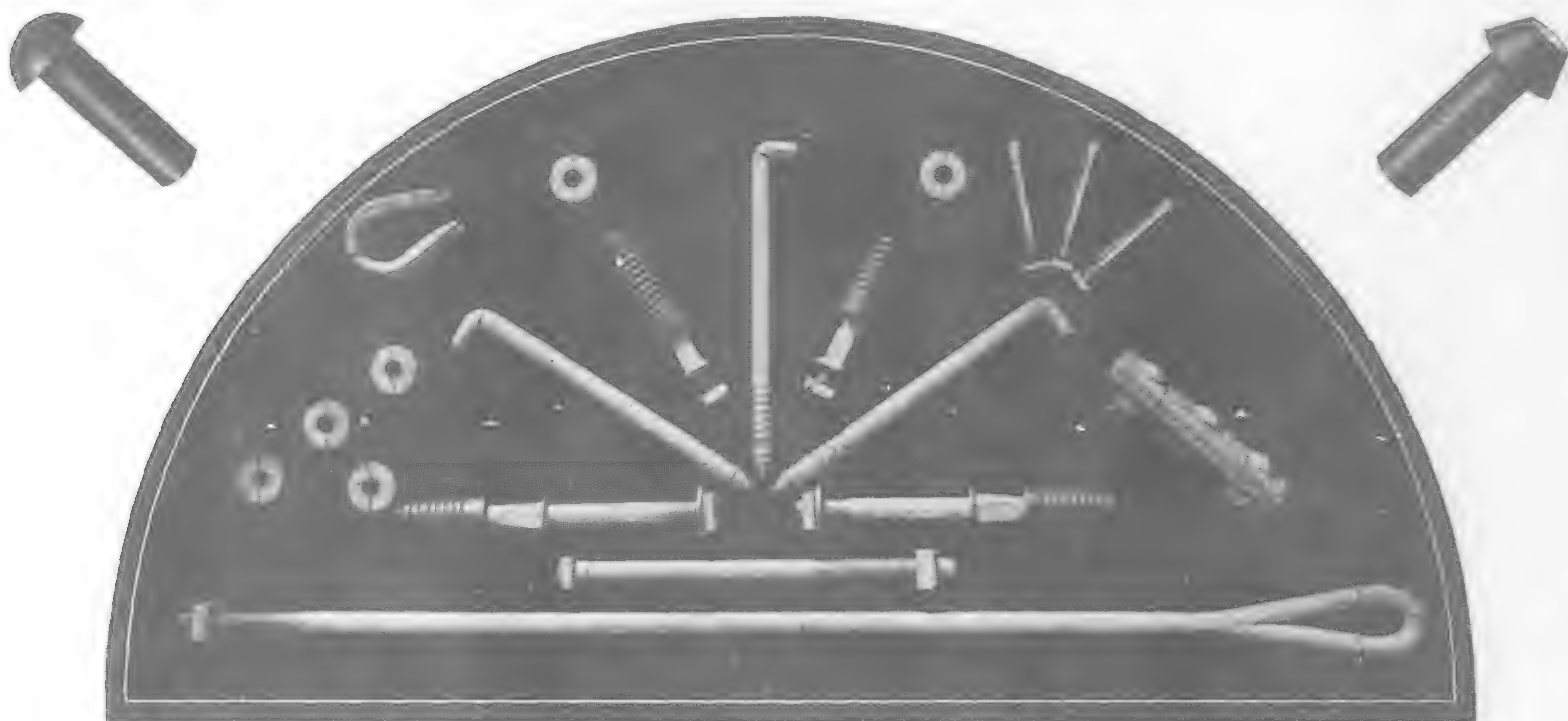


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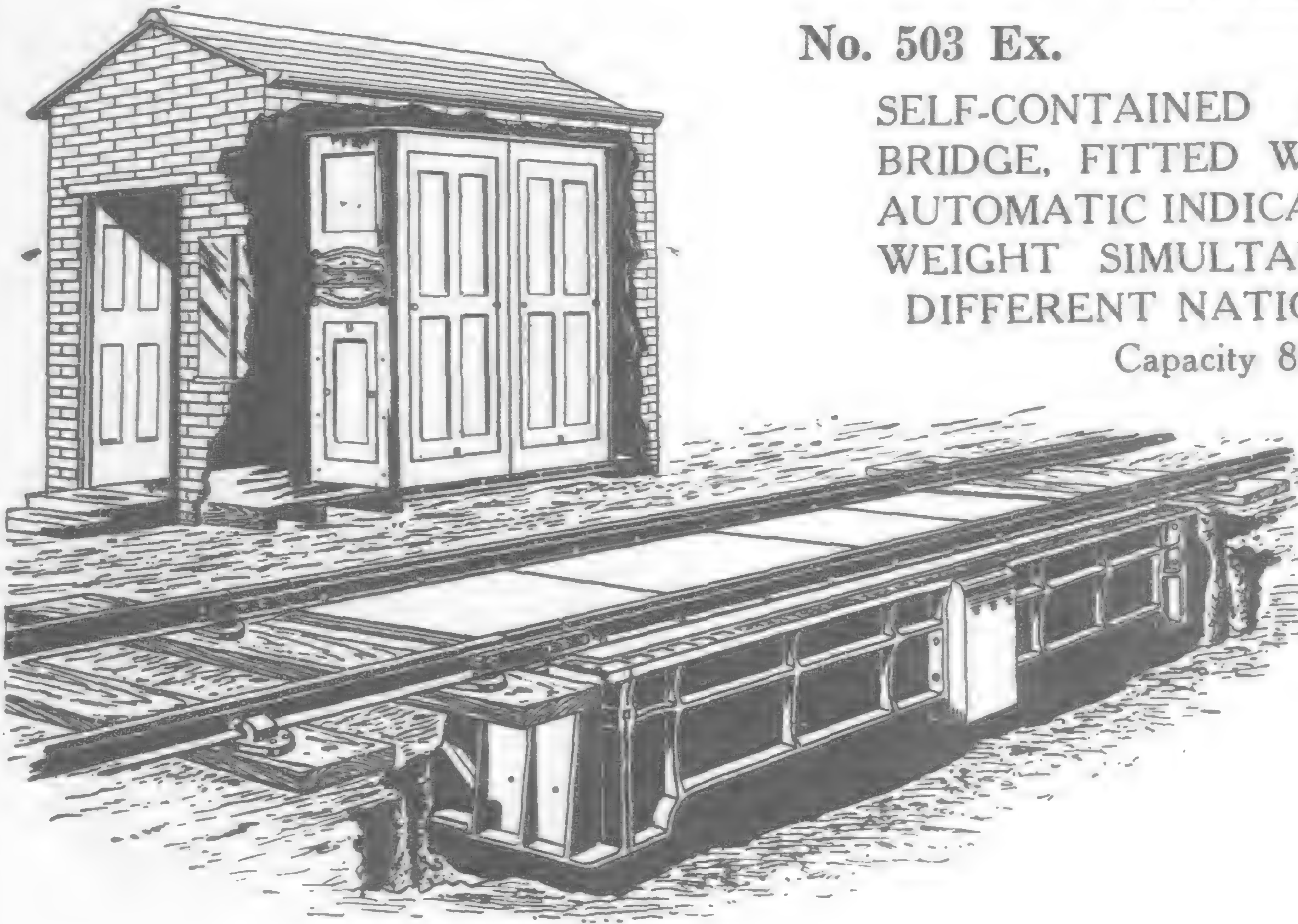
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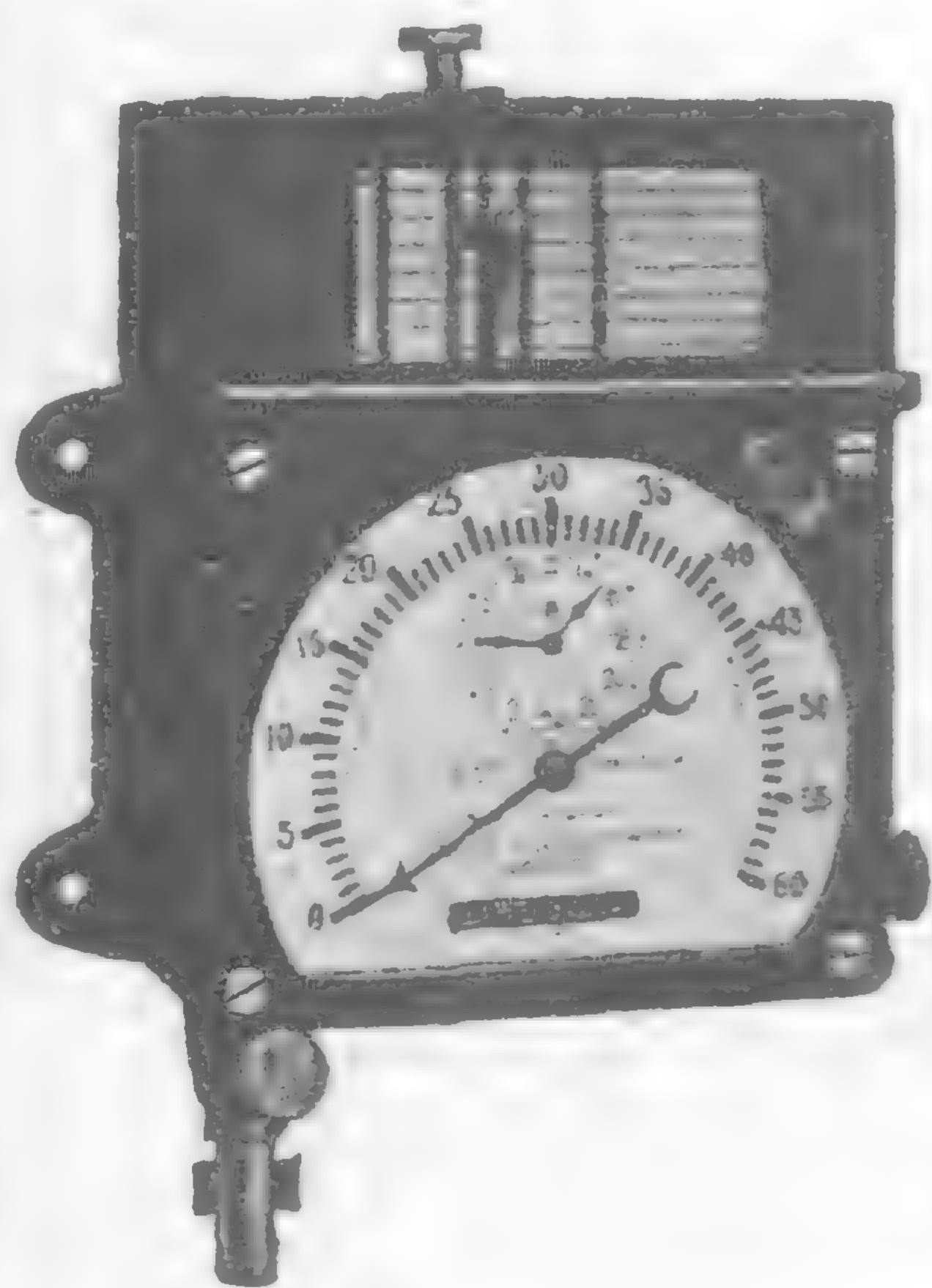
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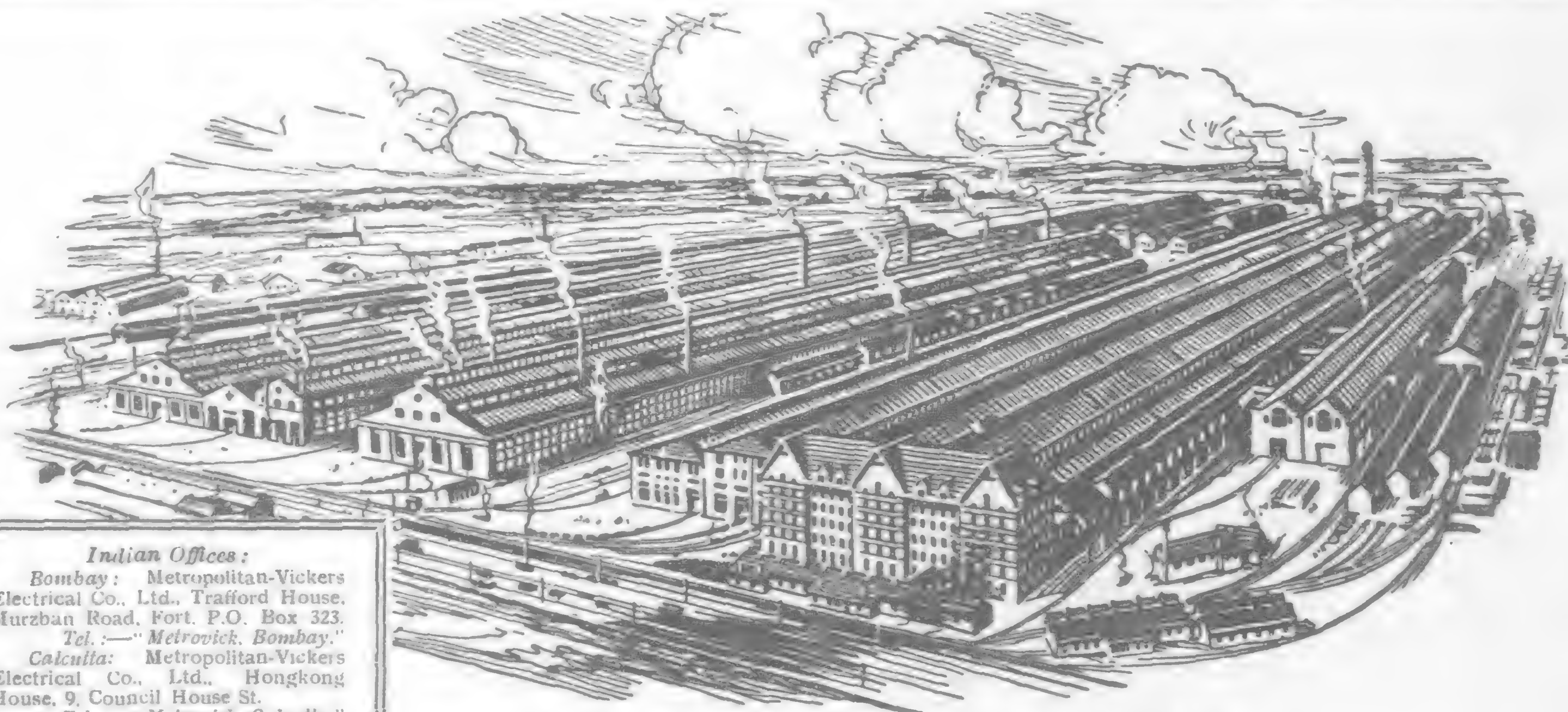
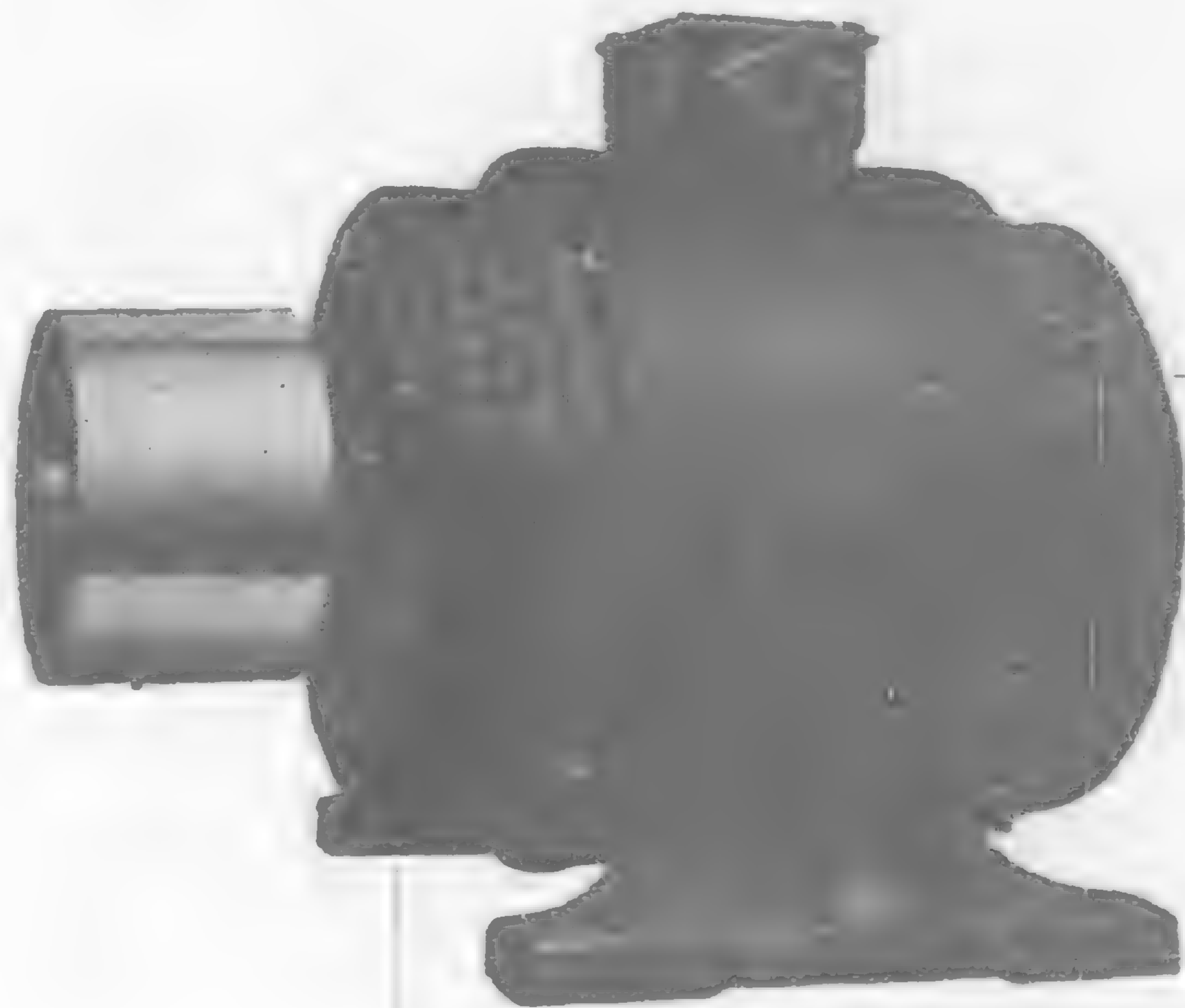
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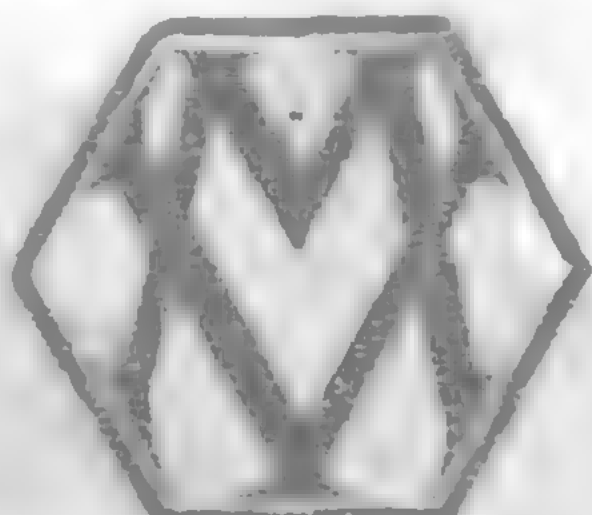
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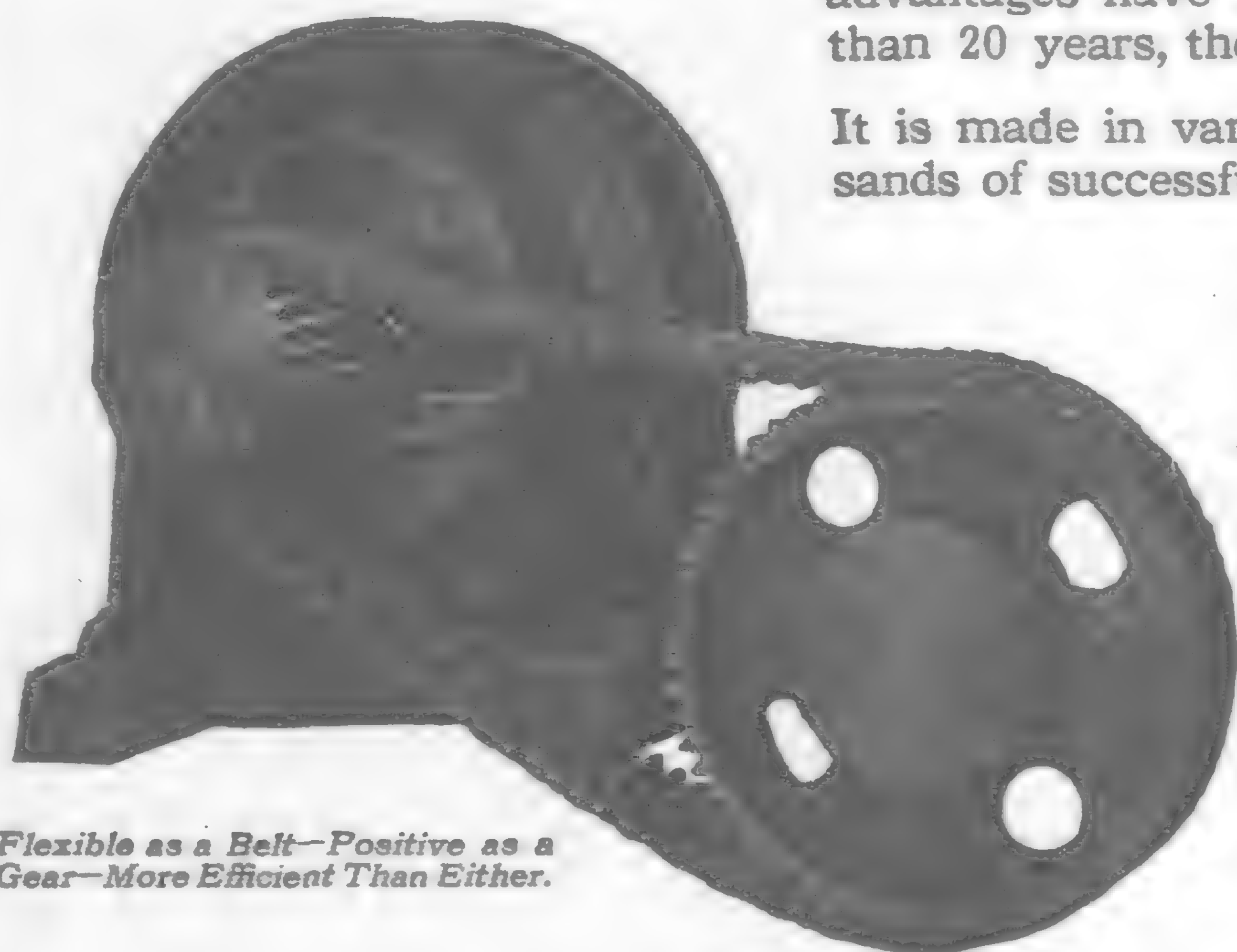
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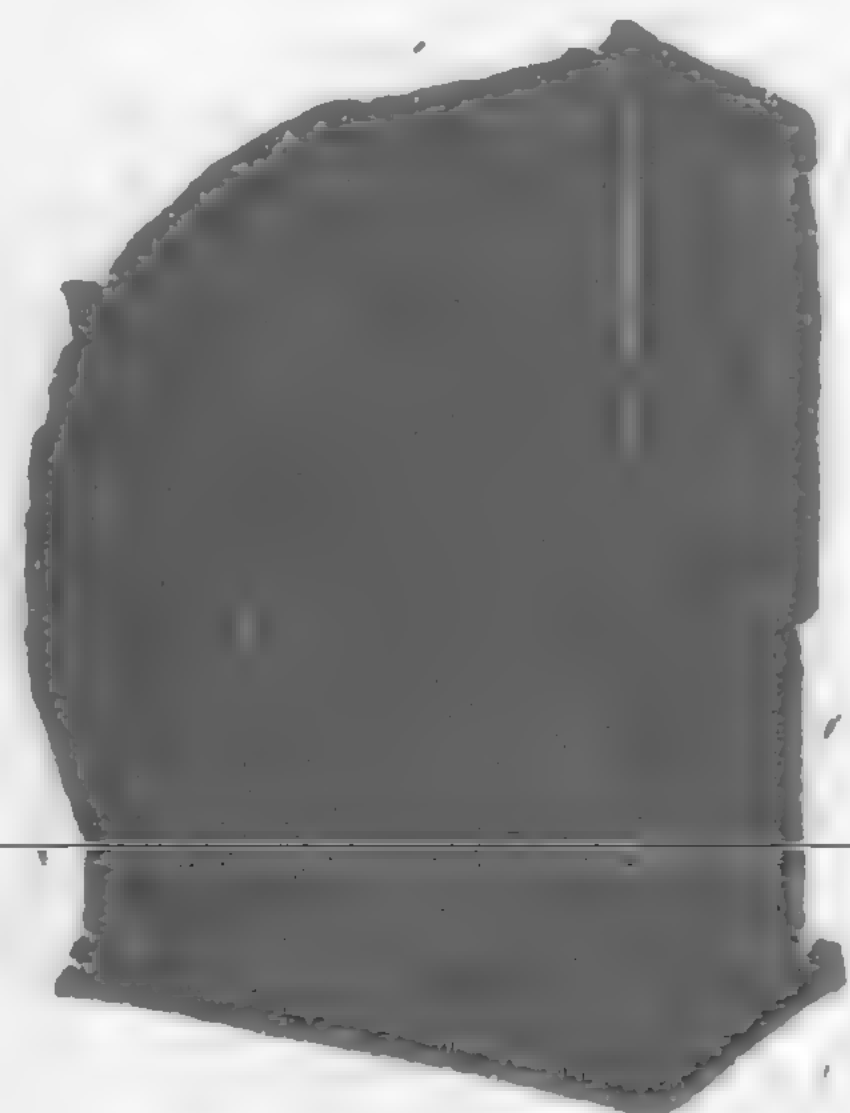
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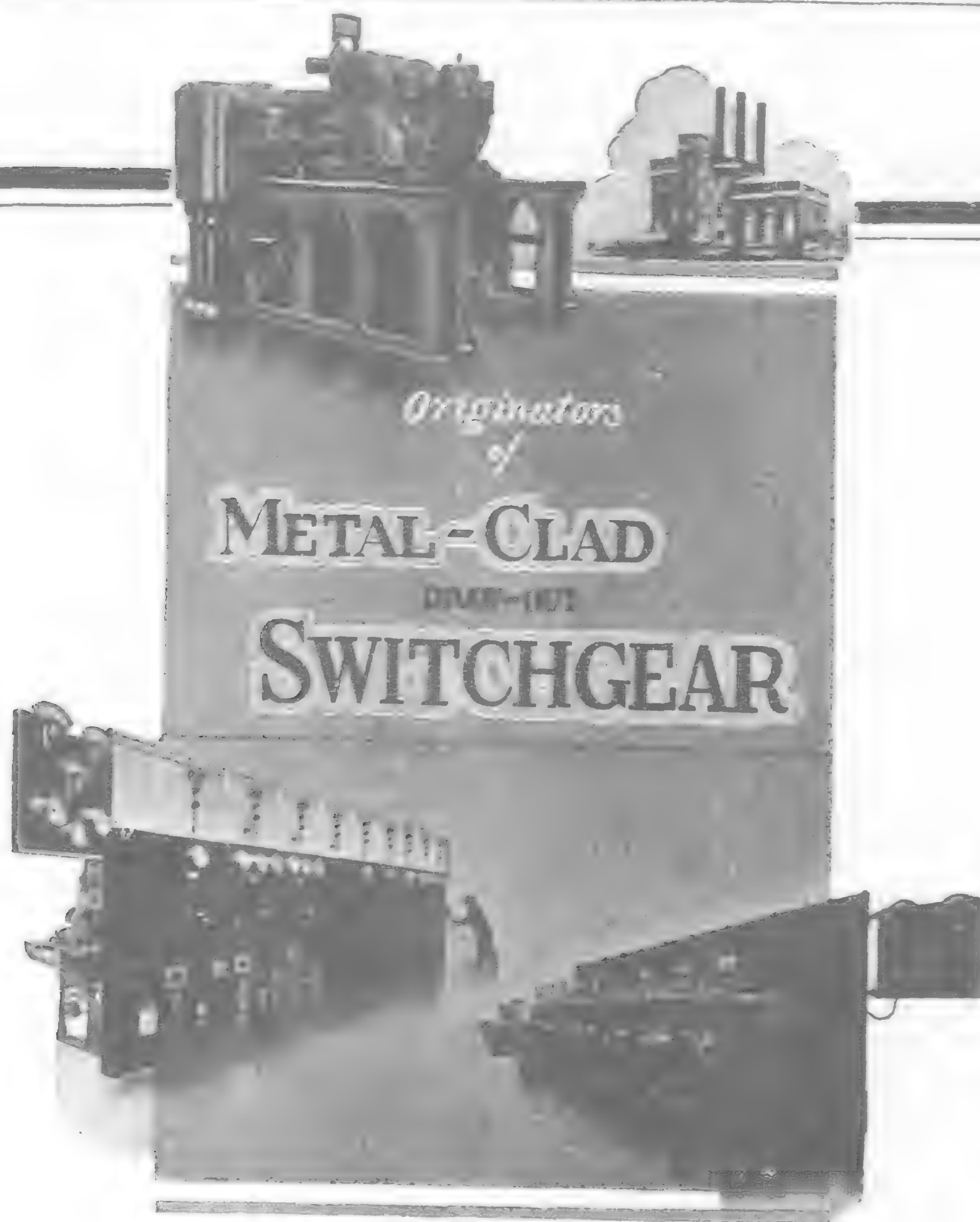
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President:

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Head Office:

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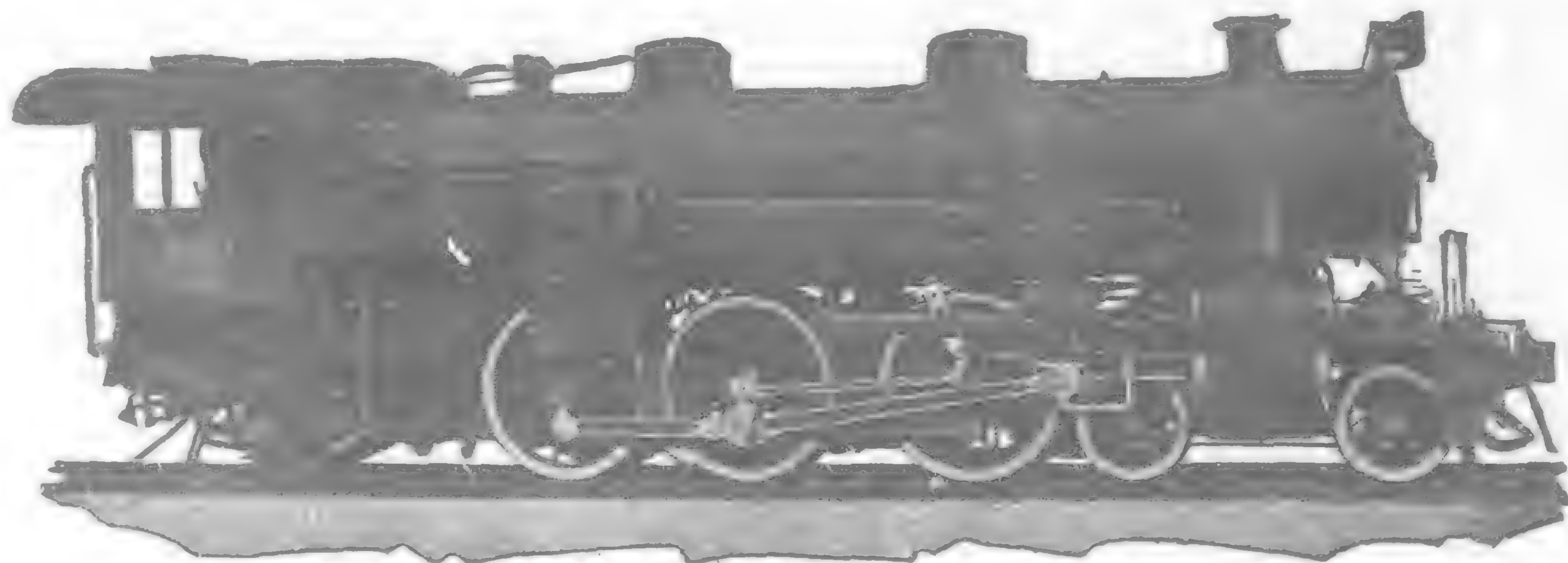
Rails, Bridges, Locomotives and other Railway Supplies
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 Factory Equipments, and all kinds of Machines
 Automobiles, Guns and Explosives
 Structural Materials, Steel Materials, Metals
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THE THREE CYLINDER LOCOMOTIVE



THREE CYLINDER PACIFIC TYPE LOCOMOTIVE

Built for the Imperial Government Railways of Japan.

Translation of an article which appeared in the "Tokyo Nichi-Nichi Shimbun"
(one of the leading Tokyo newspapers) May 22nd, 1926.

NEW LOCOMOTIVE ACCOMMODATES 300 MORE PASSENGERS

1,200 Type Shows Splendid Results Epoch
Making Motive Power For Limited Express

The Government Railways have completed operating tests of their 1,200 type 3-cylinder locomotives on the Tokaido line between Tokyo and Maibara, extending from May 12th to May 21st. The engine pulled the regular third class limited express train and four extra cars added thereto, with good results, assuring an increase of limited express accommodation and very comfortable riding for 300 more passengers. Mr. Fukui, engineer in charge of the test says, "This locomotive was built by the American Locomotive Company, and because of the three cylinder feature it causes less than half the vibration to the train as compared with ordinary present day locomotives—it gives a fine smooth start and prevents disagreeable shocks to the passengers. It pulls the regular limited express with four additional cars and still has plenty of power left to haul more. From now on this type will be the motive power for all limited express trains. Imagine pulling 17 cars and keeping the limited express speed; it surely revolutionizes the locomotive world."

For further information write to our nearest representative:

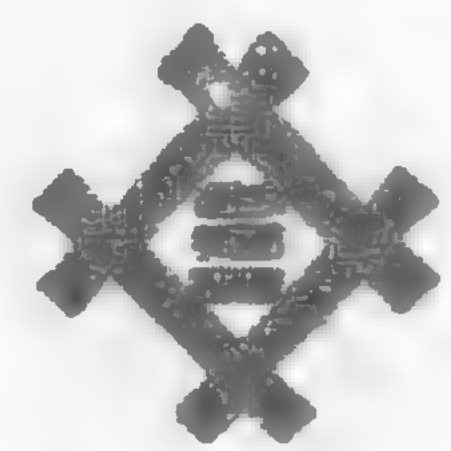
AMERICAN LOCOMOTIVE SALES CORPORATION

NEW YORK CITY, N.Y., U.S.A.

Telegraphic Addresses:

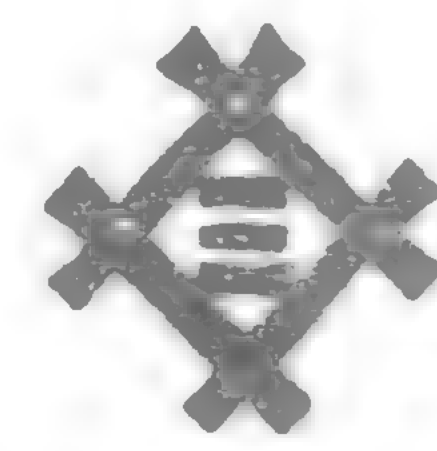
Locomotive: Peking, China
Mitsui: Tokio, Japan

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Capital: Yen 100,000,000
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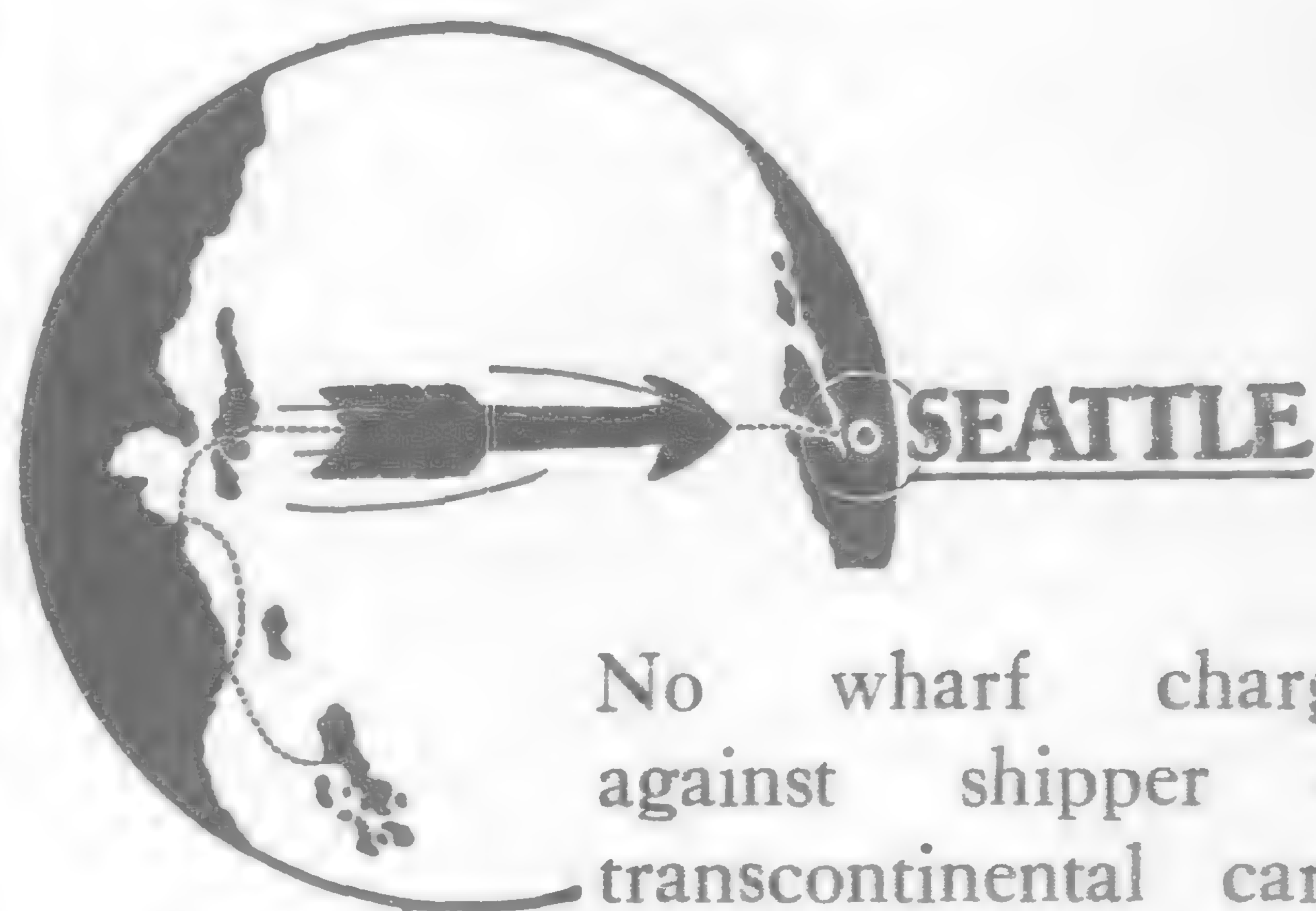
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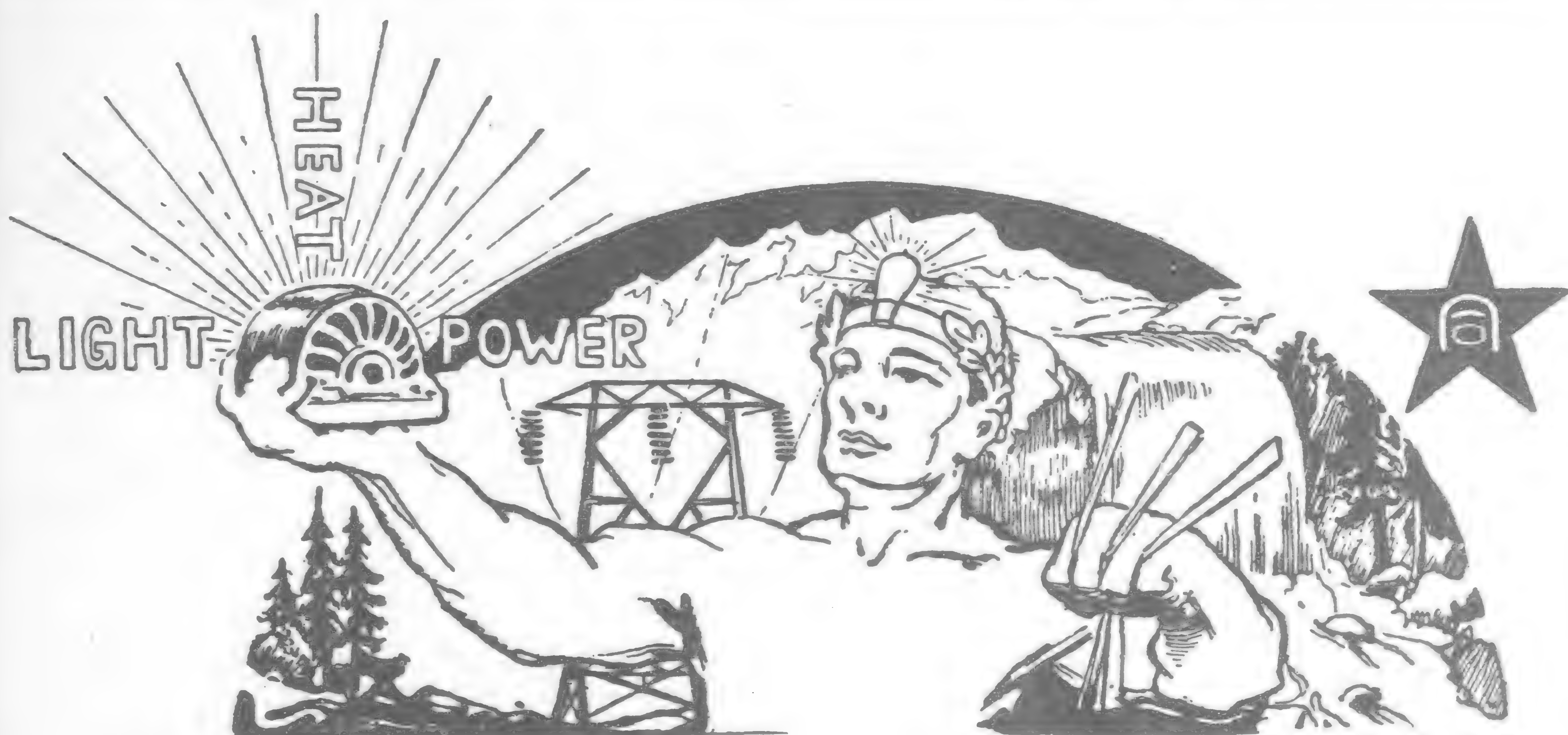


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The Forces of Nature Are the People's Servants

Through long centuries men lived on the banks of mountain streams, hunting wild beasts and tilling the soil for a livelihood, all unsuspecting the presence of a miraculous power that lay concealed within the sparkling water. The precious secret of employing that hidden power for the greater happiness of mankind was yet to be discovered.

But at last the idea of hydro-electricity was born. The world's rivers assumed a new

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To-day Japan's natural water-power resources are the foundation of an industrial structure of which the ultimate strength and scope may now be only imagined. And the corner-stone of the foundation—the leader among all the hydro-electric enterprises of Japan, is the Daido Denryoku Kabushiki Kaisha.

The Daido organization, with its six enormous power units on the Kiso River (in the Japanese Alps) has pointed the way for all future hydro-electric development in this country. Its plants are the most extensive and its power capacity the greatest in the Eastern Hemisphere. And by all who know industrial conditions in Japan, it is recognized not only as a modern and efficient business organization, but a guiding star for the forward movement of industrial organizations in the East.

The territory served by Daido comprises Japan's principal industrial districts, with a total population of 20,000,000 and constantly increasing needs for electric power.

The \$15,000,000 bond issue successfully floated by Daido in New York August 1, 1924, was the first private Japanese industrial loan to be offered in the American market.

Water Power Generated by Daido

	Kilowatt
Kisogawa Shizumo Power Station...	14,700
.. Yomigaki ..	40,700
.. Oi ..	42,900
.. Okuwa ..	11,000
.. Suhara ..	9,200
.. Momoyama ..	23,100
Yahagigawa Kushihara Power Station ...	6,000
Kuzuryugawa Nishi Kadohara Power Station ...	7,200
Total (Kilowatt) ...	154,800

Steam Power Generated by Daido

	Kilowatt
Kema Power Station ...	12,500
Ajikawa East Power Station ...	18,000
Kasugade No. 1 Power Station ...	30,000
Kasugade No. 2 ..	40,000
Total (Kilowatt) ...	100,500

Power Received from Other Sources

	Kilowatt
Bisan Electric Power—Asahi Station.	1,300
Bisan Electric Power—Tokise Station	6,000
Kisogawa Denryoku—First and Second Station ...	2,700
Chuo Electric—Otani Station ...	6,000
Kamioka Water Power—Atotsugawa First Station ...	7,200
Total (Kilowatt) ...	23,200

CAPITAL AUTHORIZED, Y112,963,000—TOTAL POWER GENERATING CAPACITY, 255,300 KILOWATT

DAIDO DENRYOKU KABUSHIKI KAISHA

(Great Consolidated Electric Power Co., Ltd.)

MOMOSUKE FUKUZAWA, *President*

NAGOYA

TOKYO
(Head Office)

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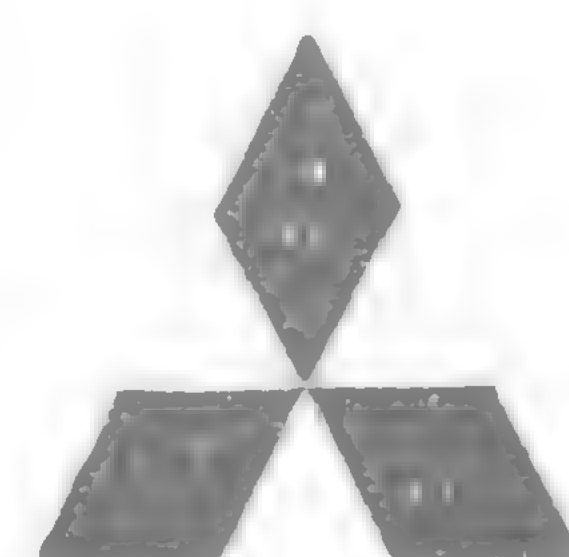
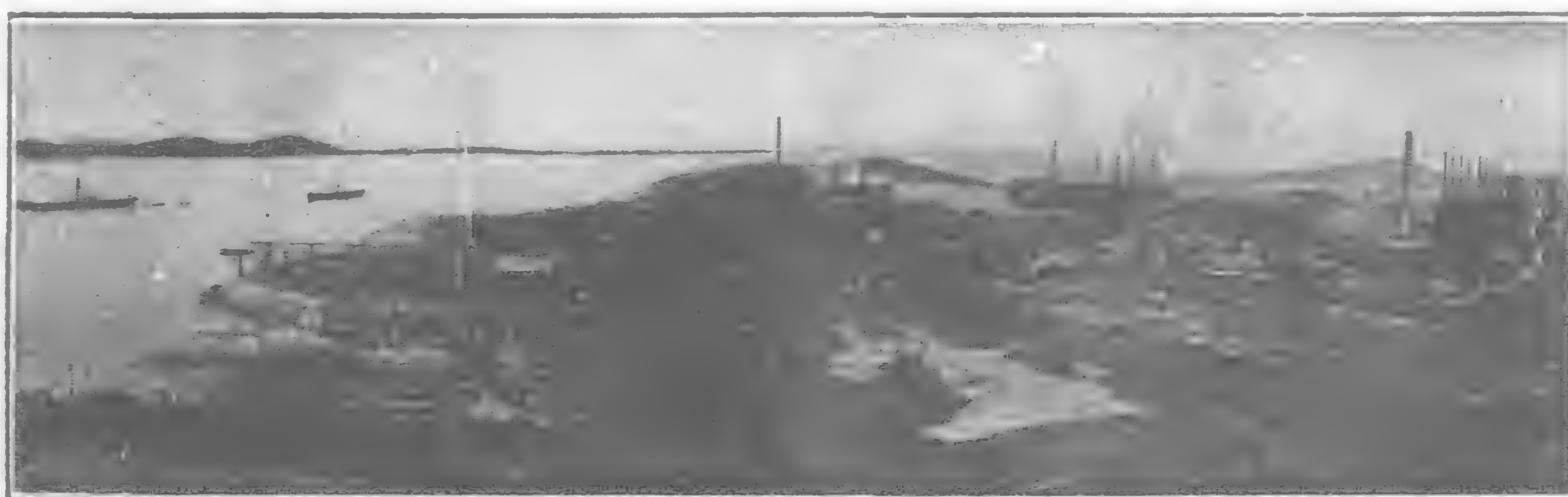
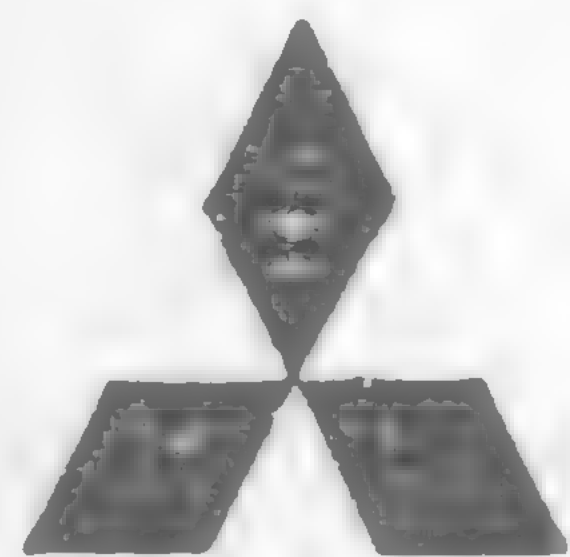
MITSUBISHI IRON AND STEEL CO., LTD.

(MITSUBISHI SEITETSU KAISHA, LTD.)

HEAD OFFICE:
MARUNOUCHI, TOKYO

CAPITAL (PAID UP):
YEN 30,000,000

MILL (LLOYD'S APPROVED):
KENJIHO, CHOSEN (KOREA)



General View of Kenjiho Iron and Steel Works.

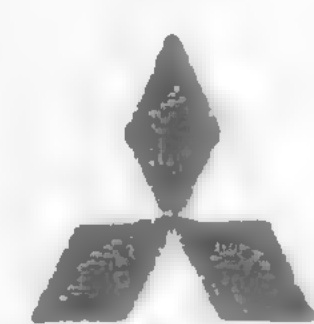
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STEEL—High Tensile & Mild Steel 50,000 tons.

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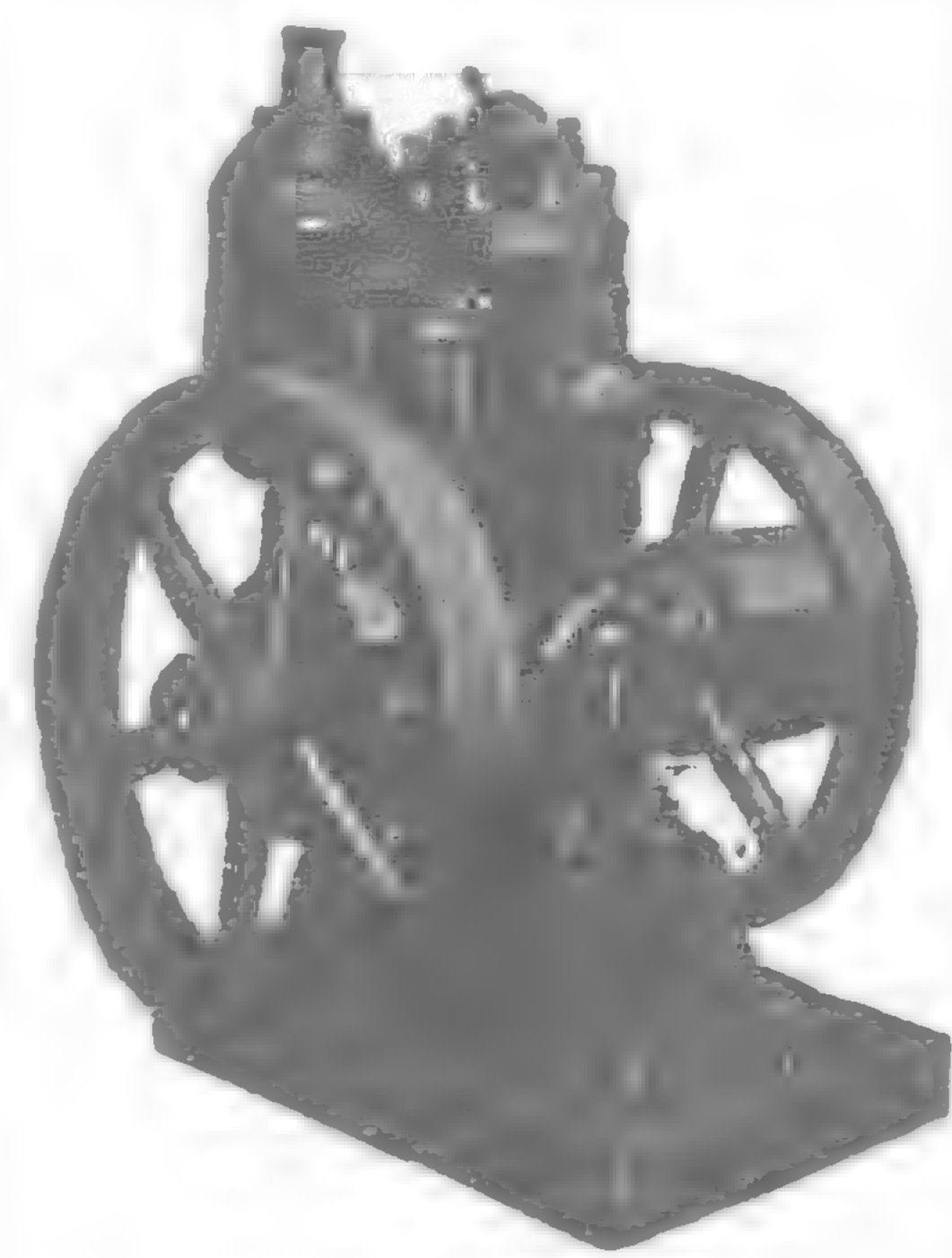
General Managers of the

KYODO UNYU KAISHA
YOKOHAMA

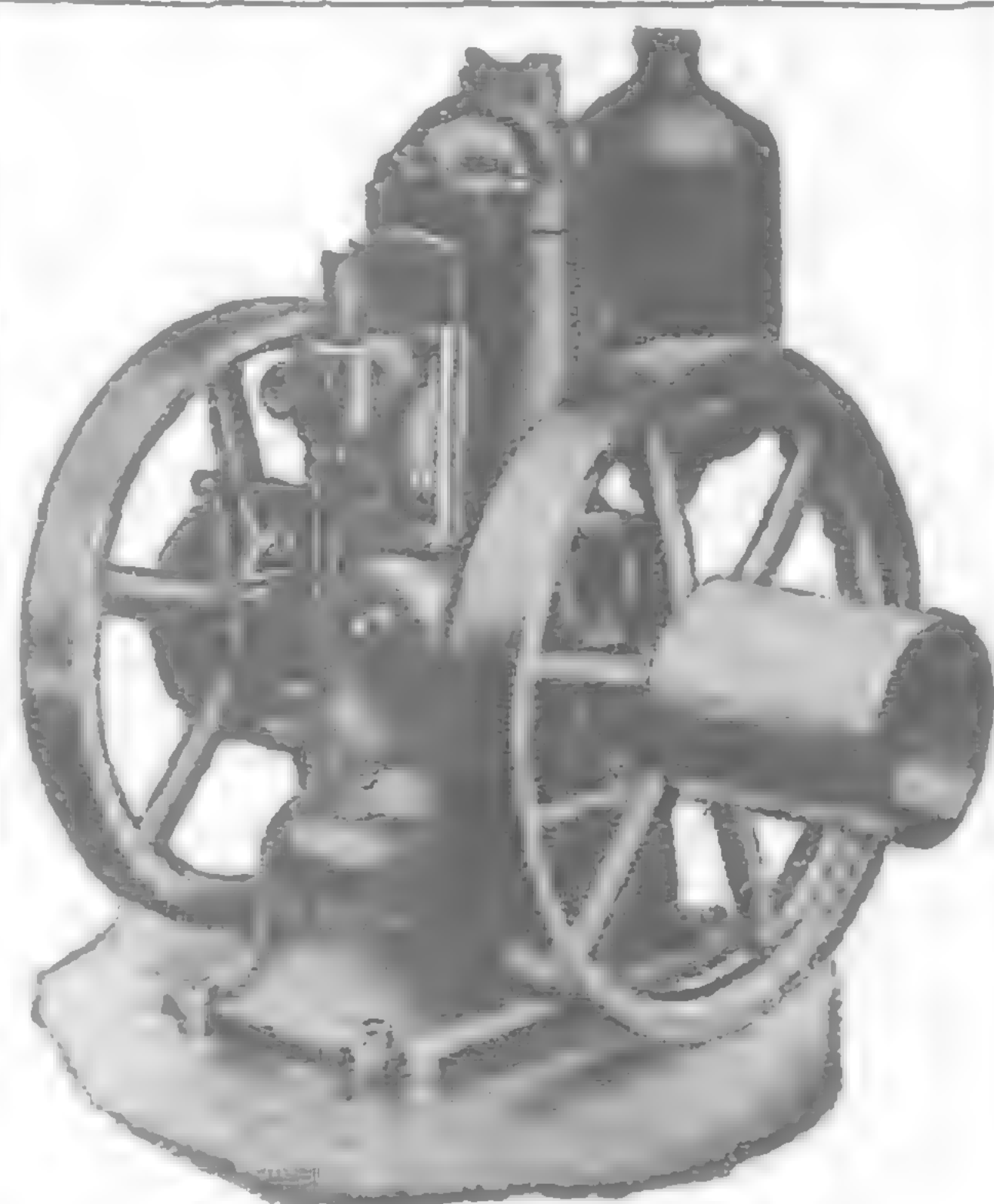
3 KAIGAN-DORI, ITCHOME
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WITH TWO BRANCHES IN TOKYO

PETTER OIL ENGINES



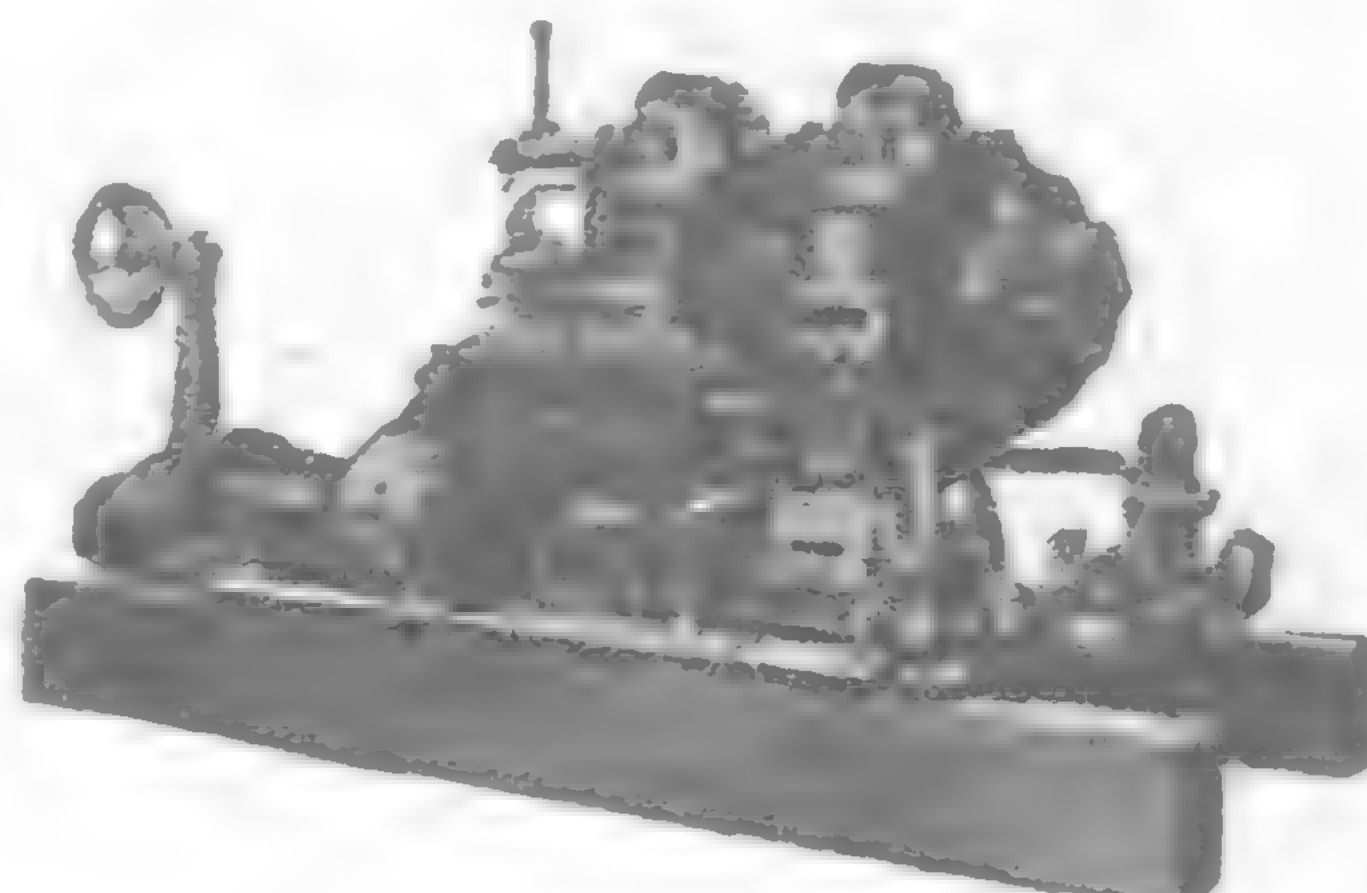
Crude Oil Engine



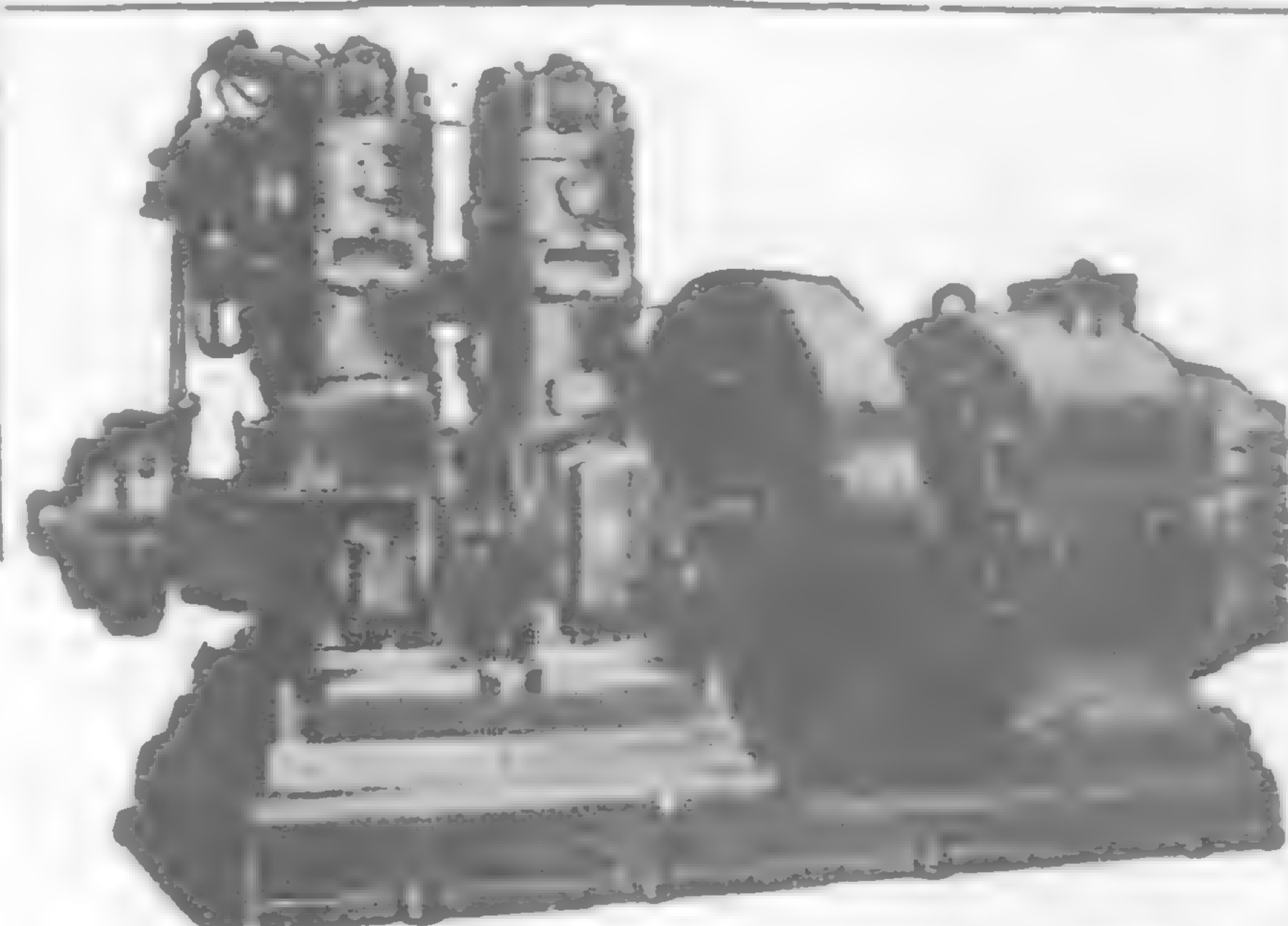
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1. Work on 2-Stroke Cycle.
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Twin-Cylinder Direct-Coupled Electric Generating Plant.

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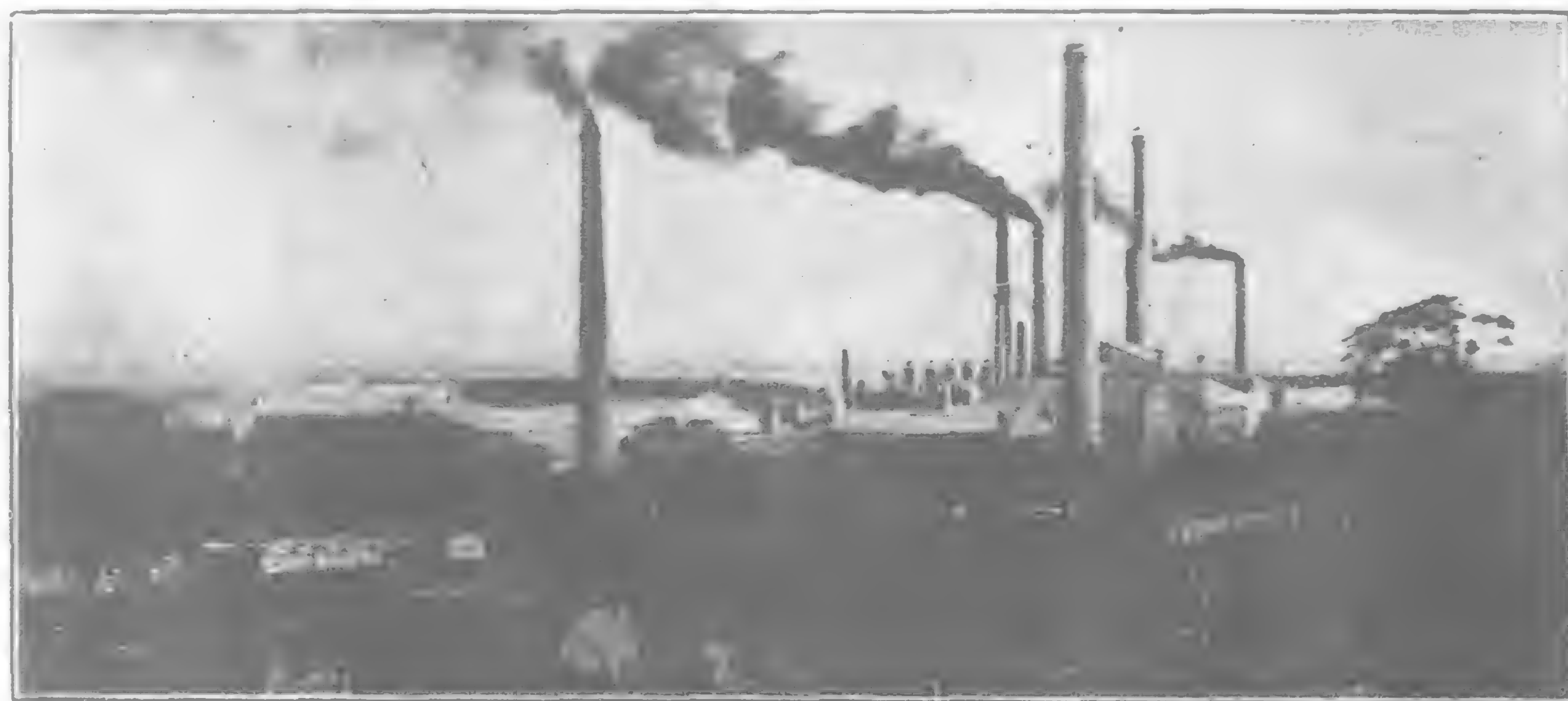
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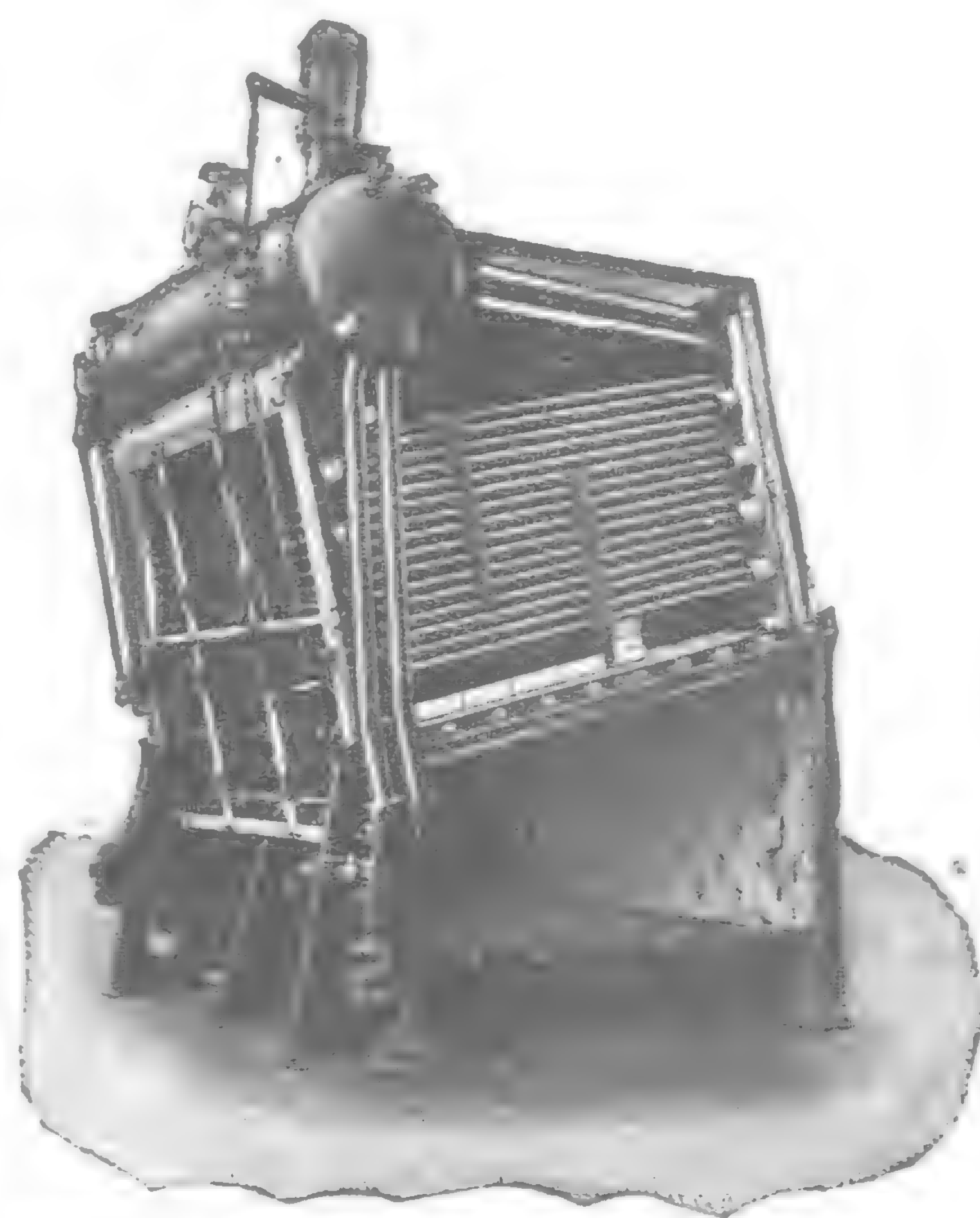
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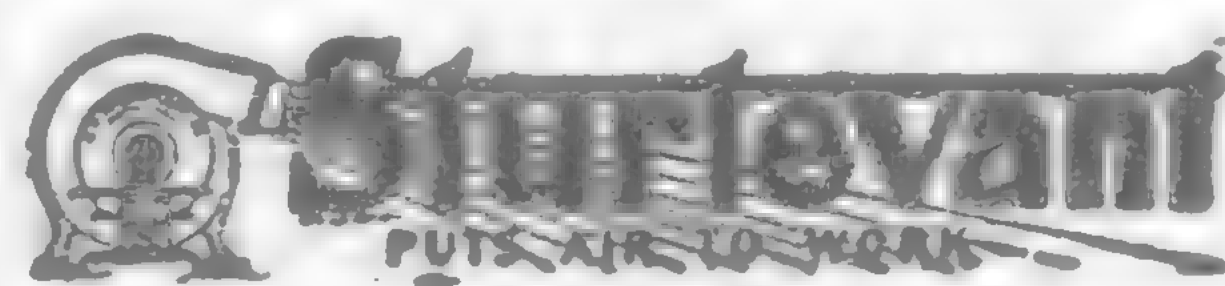
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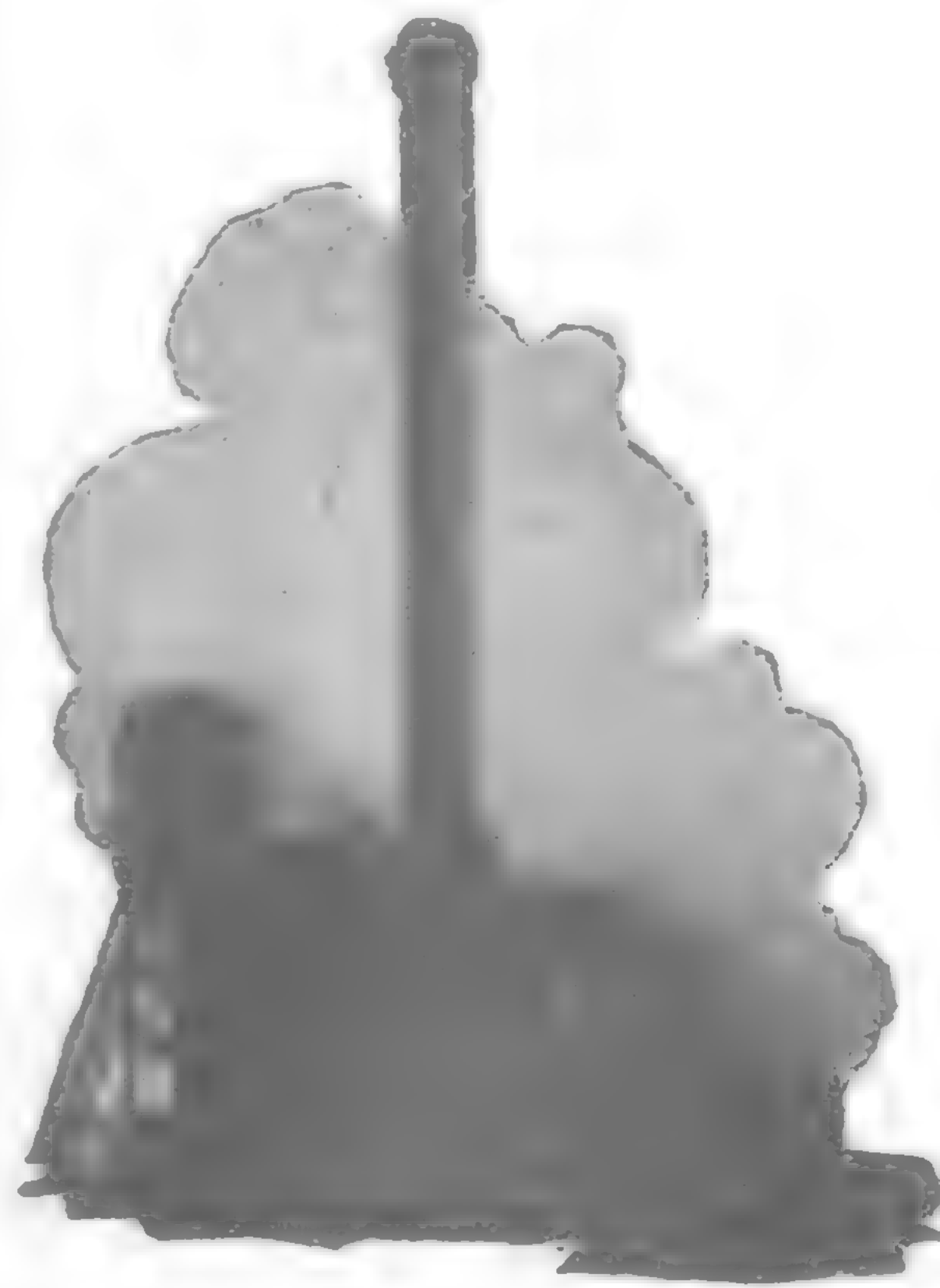
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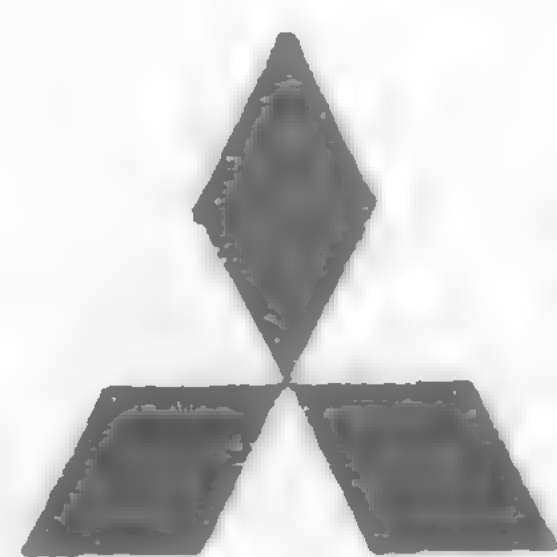
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Merchandise

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Pig Iron	100,000	"
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Coal	3,500,000	"

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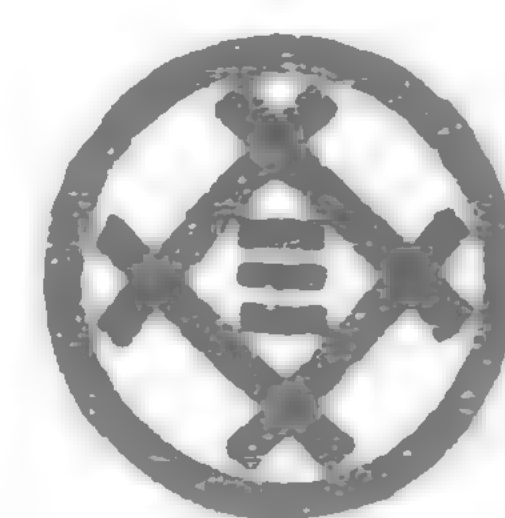
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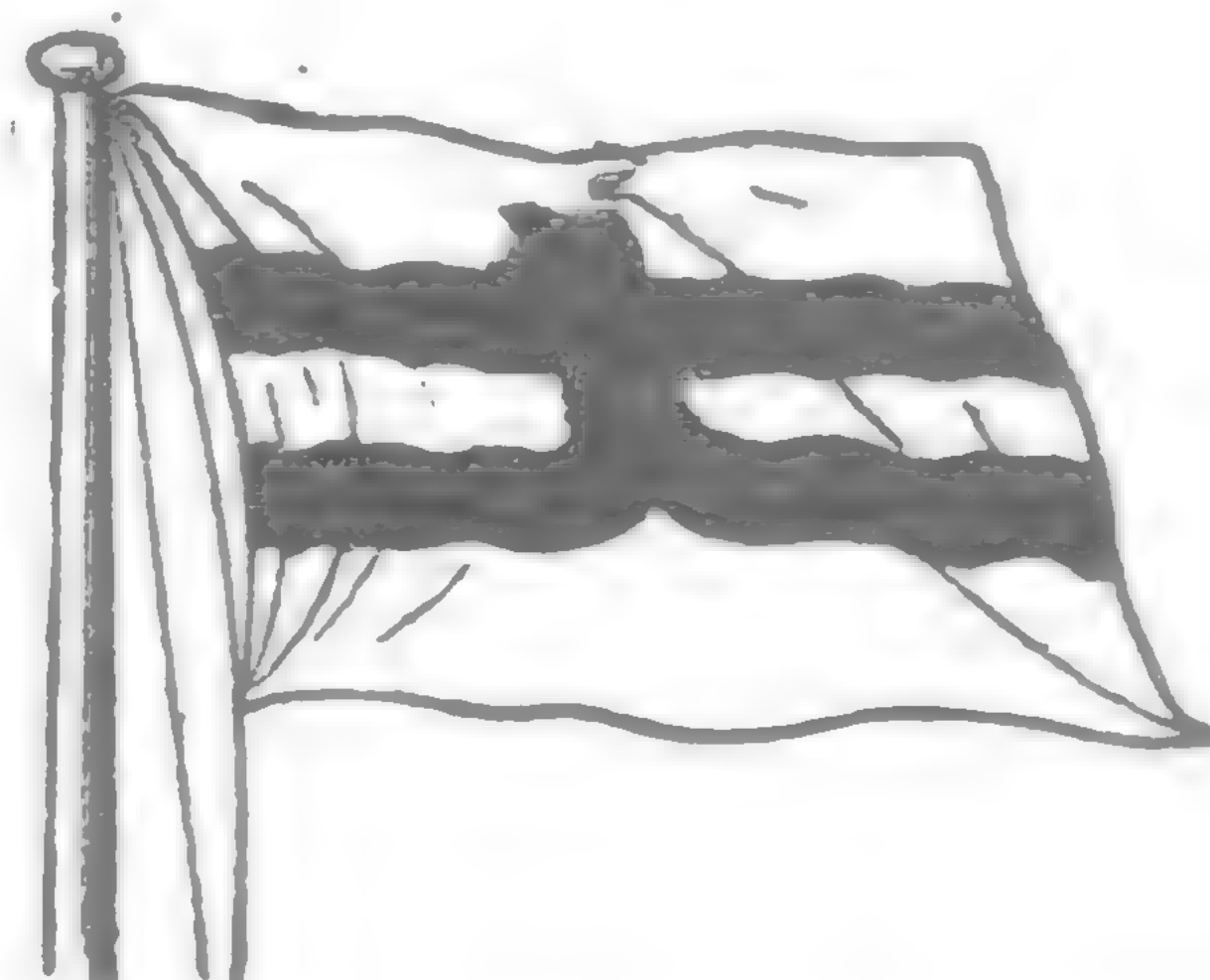
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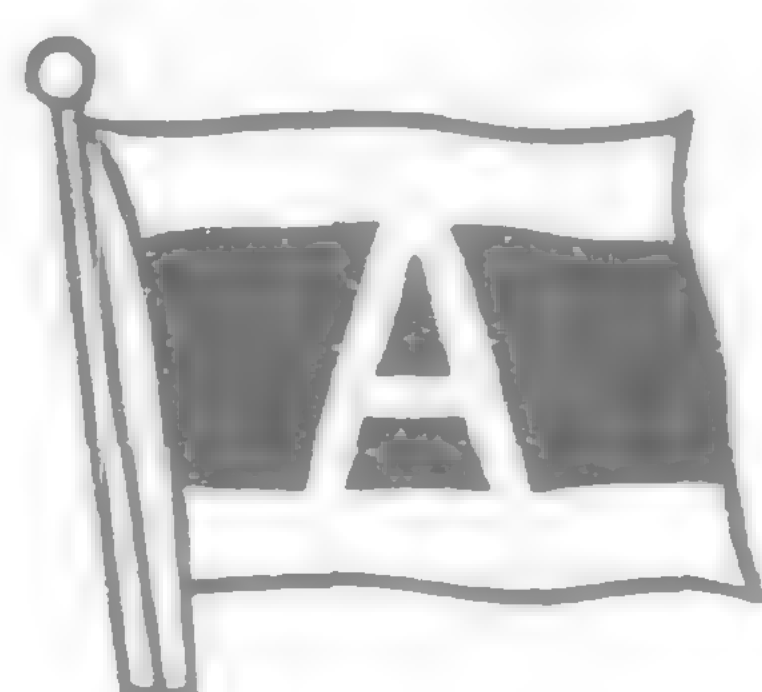
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Paid-up Capital	.	.	„ 87,500,000.00
Aggregate Tonnage	.	.	500,000 Tons

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Vancouver-Marui	9,100	Suez-Marui	6,600
Boston-Marui	8,800	Daio-Marui	9,000
Tofuku-Marui	9,100	Kashu-Marui	8,800
Chifuku-Marui	9,100	No. 2 Kifunesan-Marui	5,000
Ryufuku-Marui	9,100	Yousan-Marui	5,000
Hankow-Marui	6,400	Taisan-Marui	5,000
Yoni-Marui	11,000	Yuri-Marui	11,000
Taibu-Marui	8,900	Texas-Marui	11,000
San Francisco-Marui	9,100	Tamatsu-Marui	6,600
Naple-Marui	9,100	Eifuku-Marui	9,100
Glasgow-Marui	9,100	Kifuku-Marui	9,100
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Yezari-Marui	6,900	England-Marui	9,100
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Shanghai-Marui	6,400	New York-Marui	9,100
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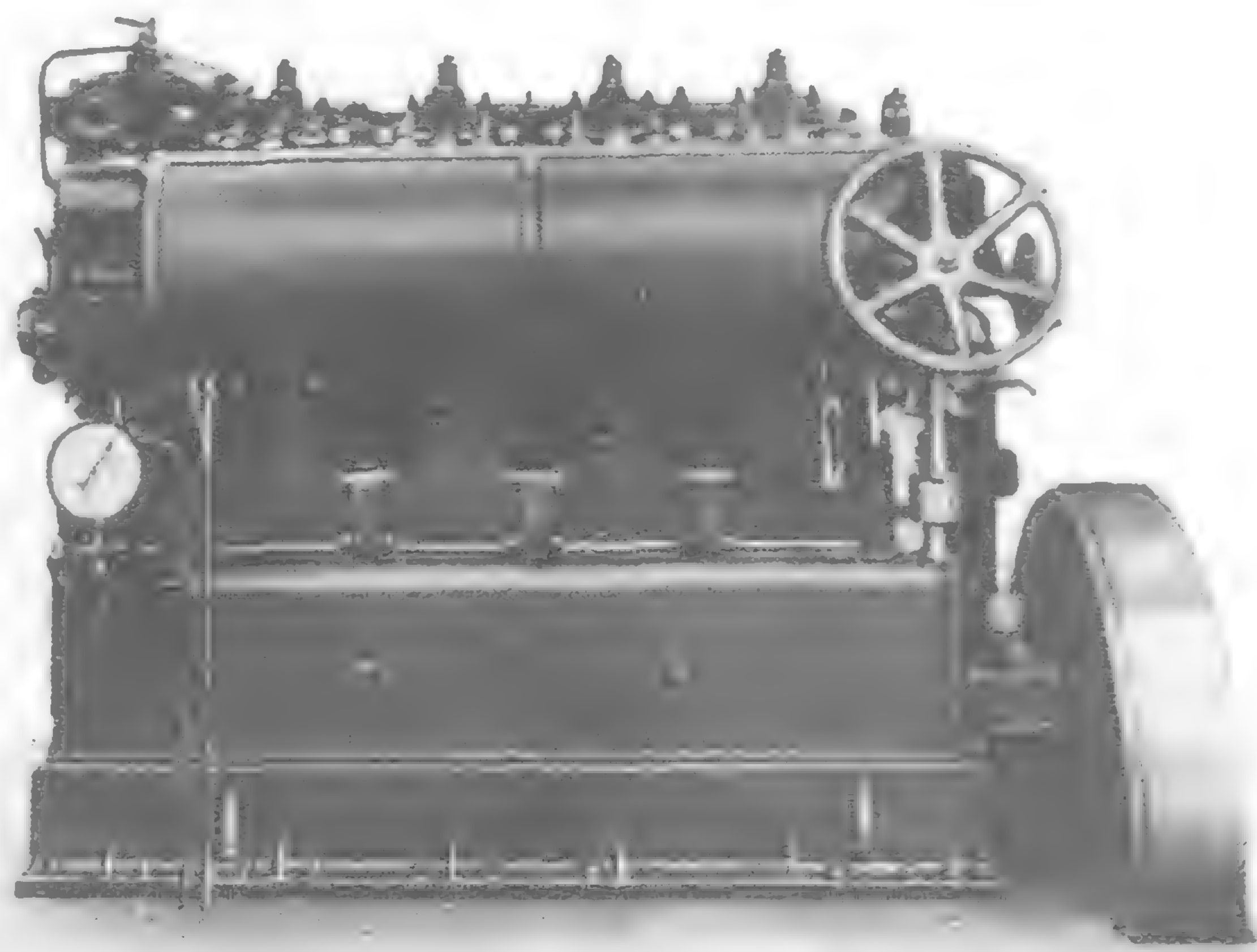
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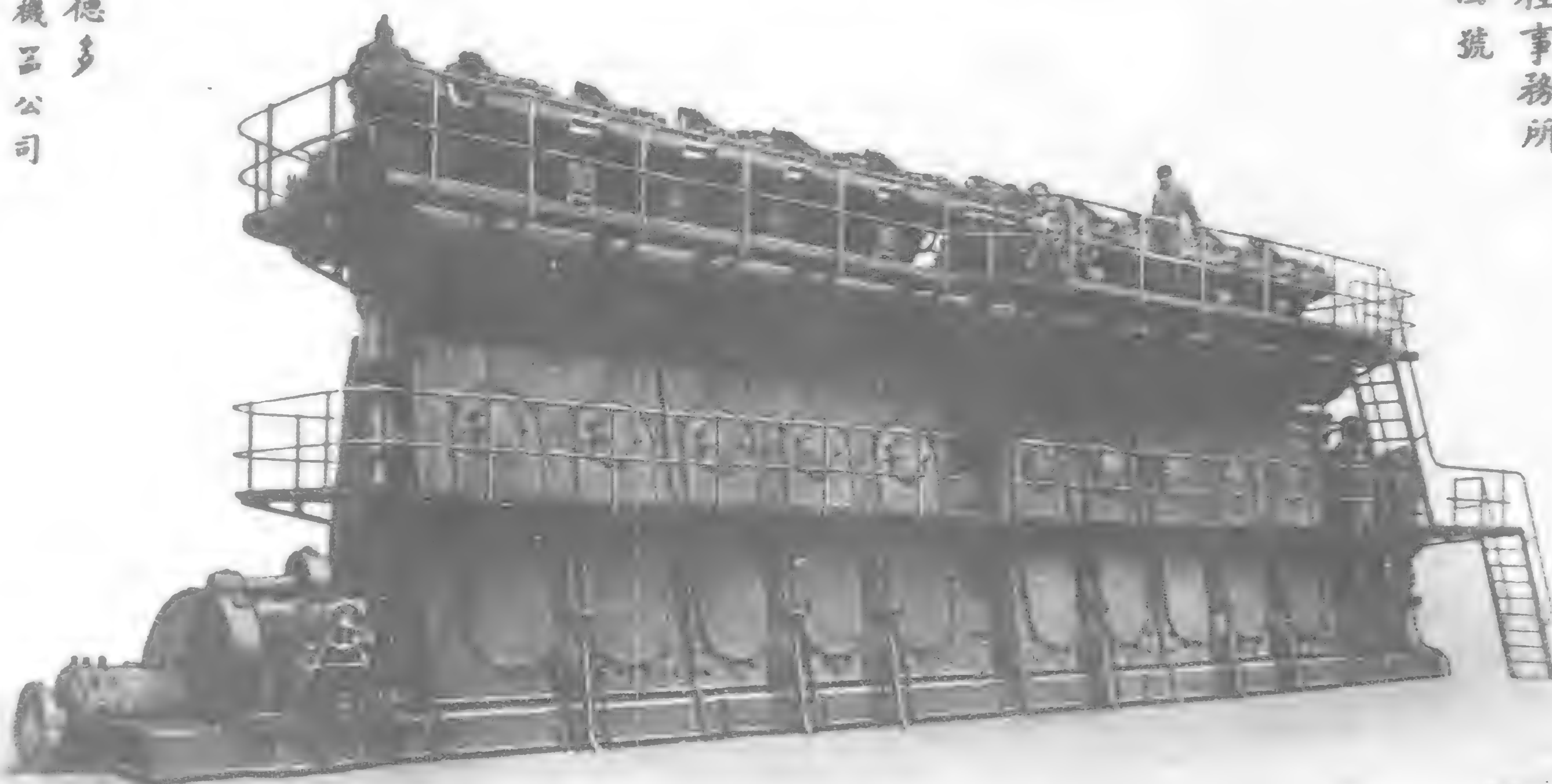
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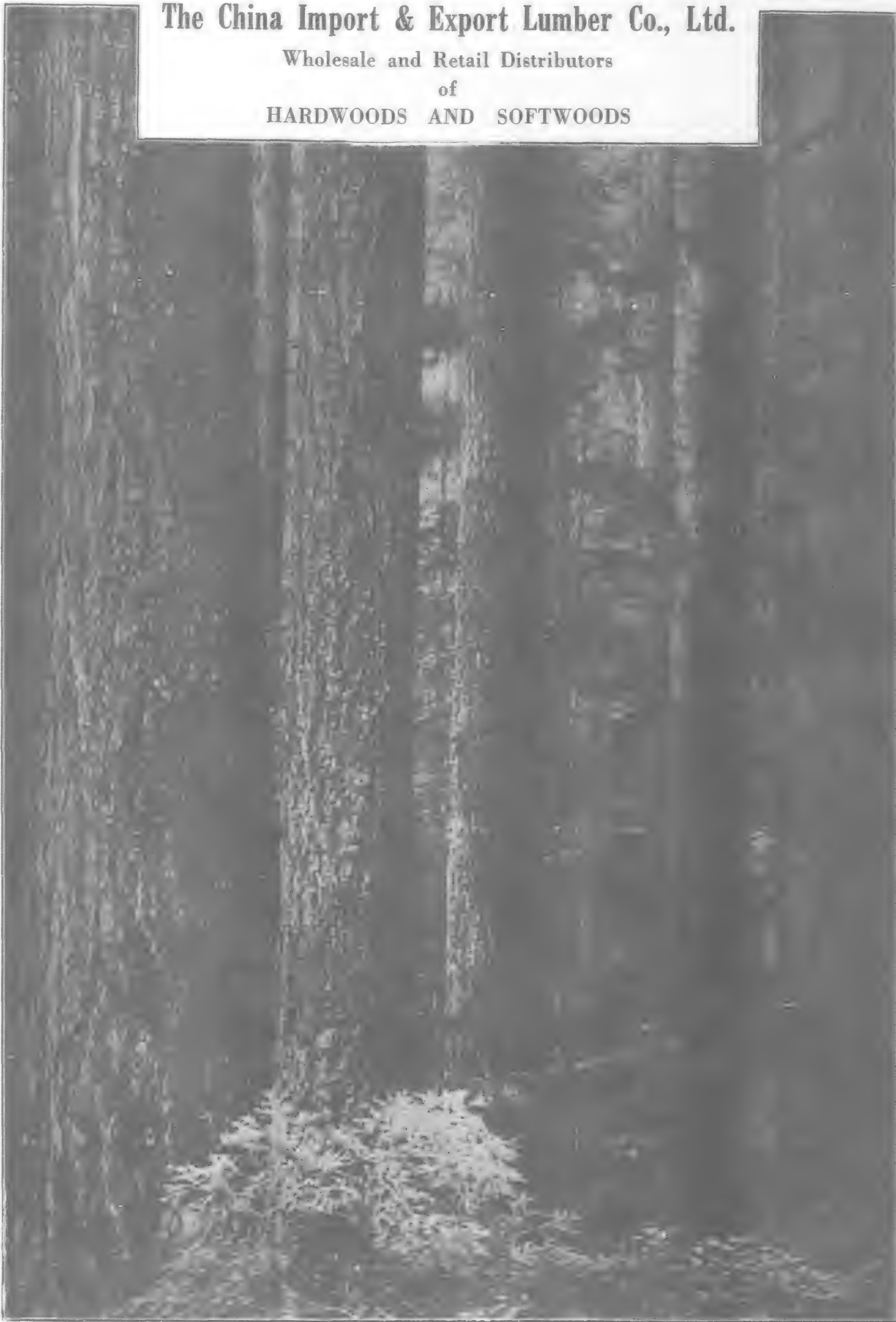
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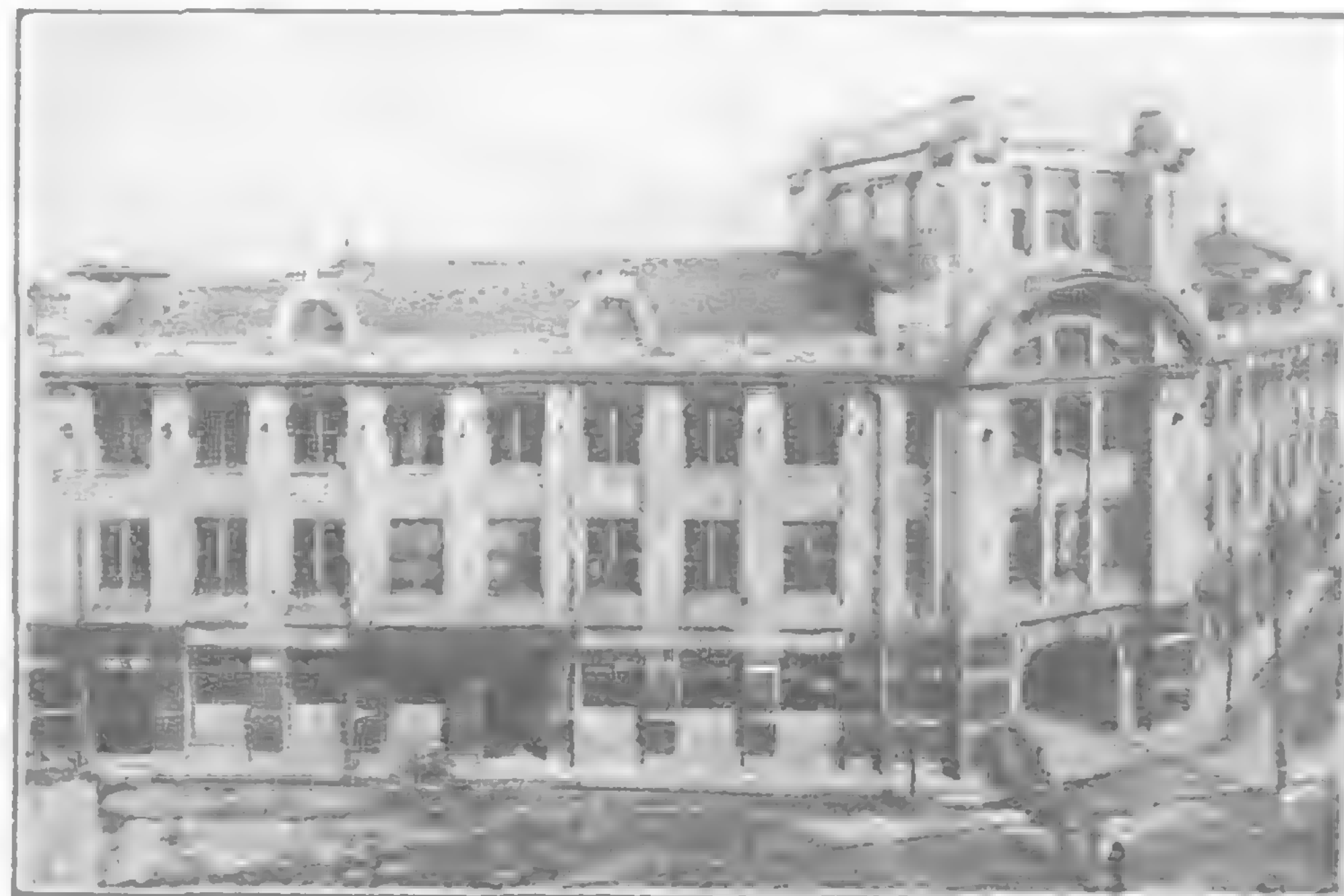
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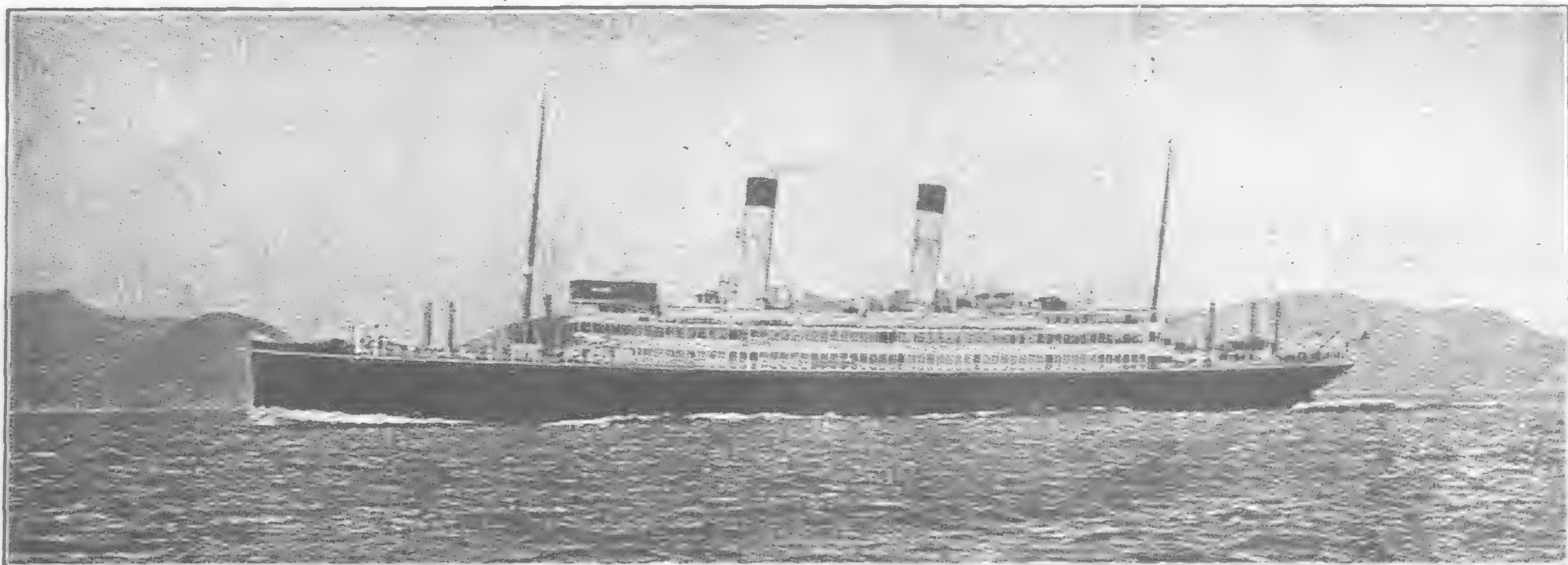
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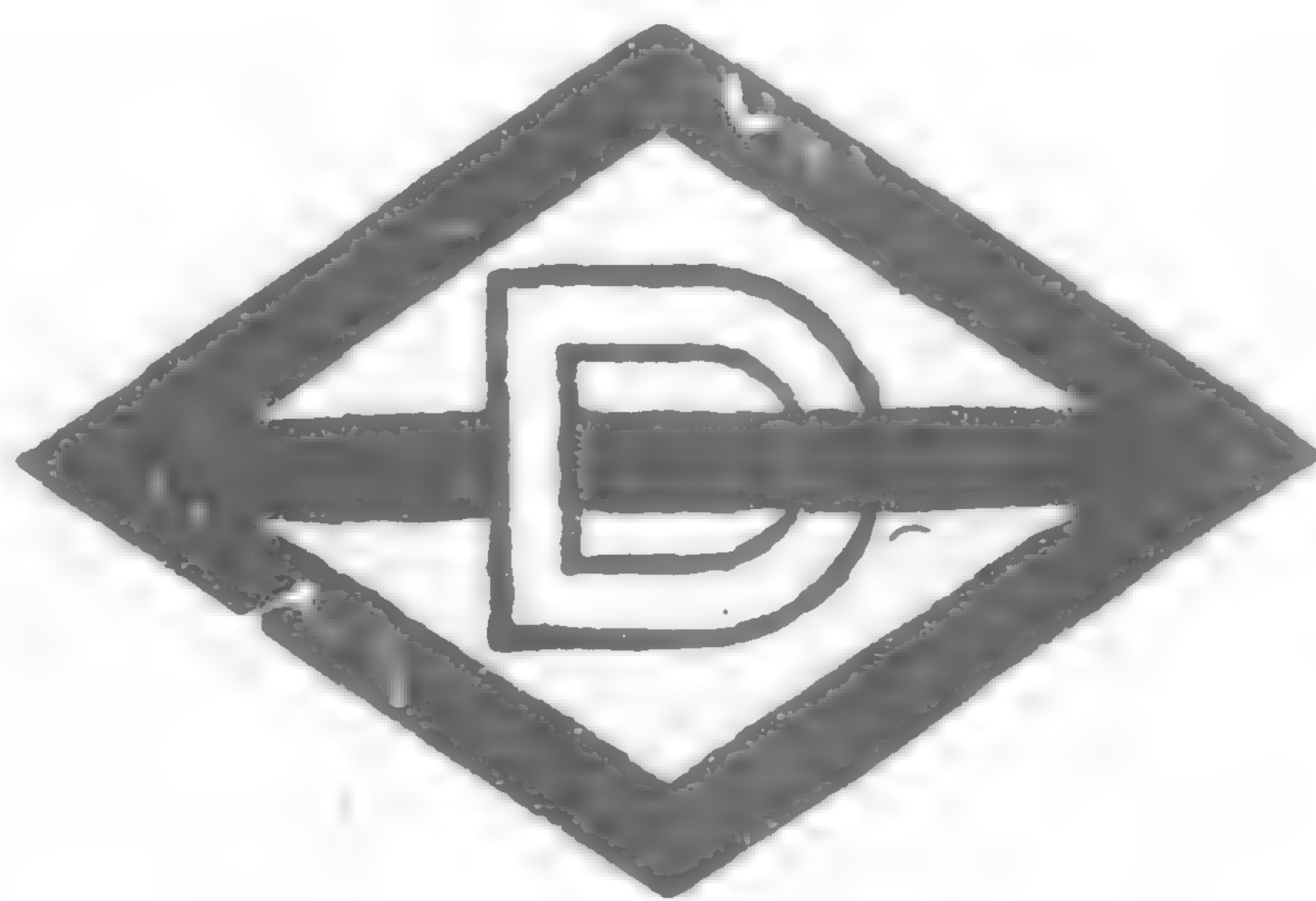
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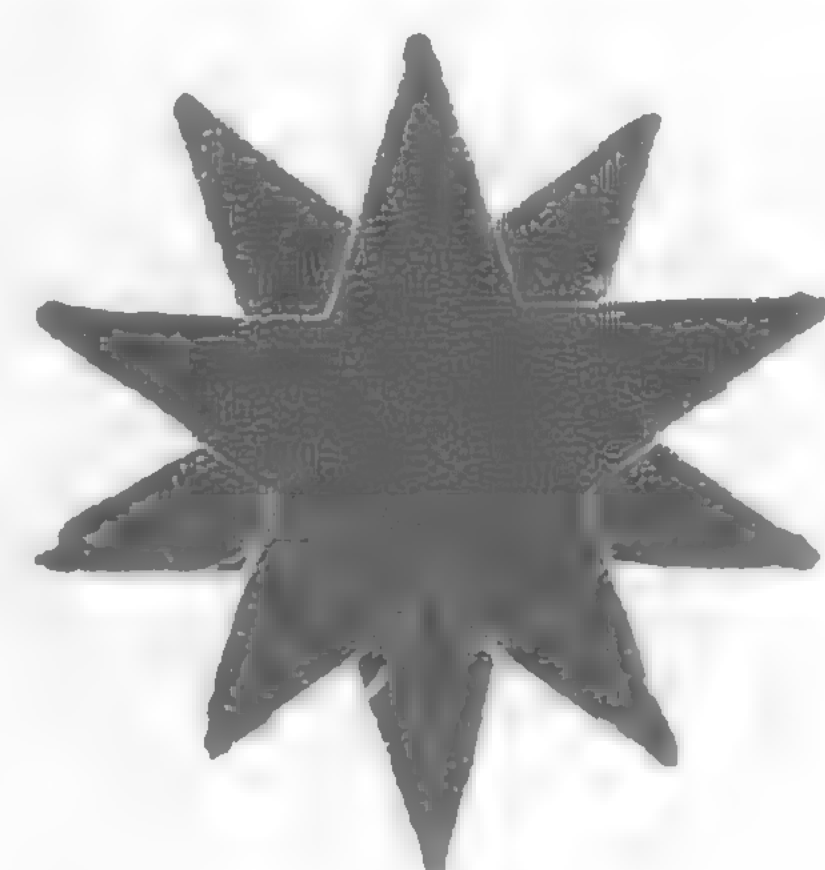
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Foreign business transacted at HEAD OFFICE, OSAKA (Sanchoe, Koraibashi Higashi-ku), KOBE (Itchome, Sakae Machi Dori) and YOKOHAMA (Nichome, Honmachi.)



THE DAI-ICHI GINKO, LTD.

(FORMERLY THE FIRST NATIONAL BANK)

ESTABLISHED 1873

Capital (Paid Up)	-	-	-	Yen 50,000,000.00
Reserve Funds	-	-	-	Yen 49,000,000.00

Y. SASAKI, *President*

K. ISHII, *Managing Director.*

Y. NOGUCHI, *Managing Director.*

S. SUGITA, *Managing Director.*

HEAD OFFICE:

No. 1 KABUTO-CHO, NIHONBASHI-KU, TOKYO.

T. AKASHI, *Manager*

CITY BRANCHES:

MUROMACHI, SHIN-OSAKACHO, FUKAGAWA, MARUNOUCHI, KYOBASHI, ASAKUSA.

HOME BRANCHES:

YOKOHAMA, NAGOYA, TAMAYACHO (NAGOYA), YOKKAICHI, KYOTO, NISHIJIN (KYOTO), GOJO (KYOTO), FUSHIMI, OSAKA, NISHIKU (OSAKA), MINAMIKU (OSAKA), HONMACHI (OSAKA), KOBE, HYOGO, KYOMACHI (KOBE), HIROSHIMA, SHIMONOSEKI, CHOFU, MOJI, KOKURA, FUKUOKA, KURUME, KUMAMOTO, HAKODATE, OTARU, SAPPORO, MURORAN.

BRANCHES IN COREA:

SEOUL, FUSAN.

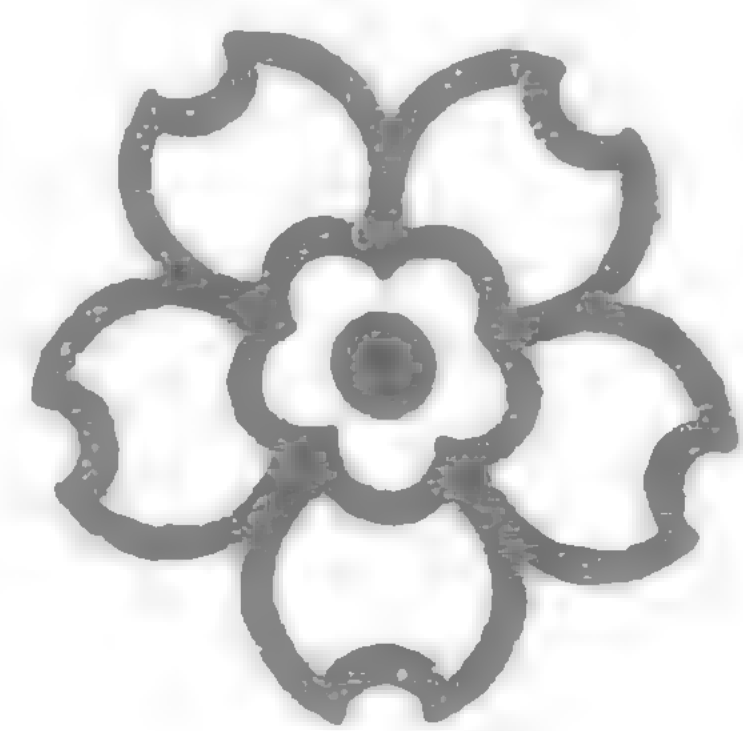
LONDON & NEW YORK BANKERS:

London { Westminster Bank, Ltd.
Midland Bank, Ltd.
The Yokohama Specie Bank, Ltd.

New York { The National City Bank of New York.
The National Bank of Commerce in New York.
The Yokohama Specie Bank, Ltd.

CORRESPONDENTS:

The Bank, in addition to its own Branches, has numerous Agencies or Correspondents in the principal Cities and Towns at Home and Abroad.



THE BANK OF CHOSEN

Capital Subscribed - - - Yen 80,000,000

Capital Paid-up - - - Yen 50,000,000

Governor : K. Nonaka, Esq.

Deputy-Governor : S. Suzuki, Esq.

Directors :

Y. Katayama, Esq.

M. Hashimoto, Esq.

I. Iuchi, Esq.

T. Kakiuchi, Esq.

Head Office : SEOUL (Korea)

FOREIGN DEPARTMENT (TOKYO)

(All communications relating to correspondence arrangements and the Bank's general foreign business to be addressed to the Foreign Department)

Branch Offices:

Japan Proper—Tokyo, Osaka, Kobe, Shimonoseki

Korea—Chemulpo, Pyengyang, Fusan, Wonsan, Taiku, Chinnampo, Kunean, Mokpo, Hoilyong, Chungjin

Manchuria—Antung, Mukden, New Town (Mukden), Dairen, Yingkow (Newchwang), Changchun, Harbin, Tiehling, Liaoyang, Ryojun, Kaiyuan, Chengchiatun, Szupingchieh, Fuchiatien, Kirin, Lungchingsun

China Proper—Shanghai, Tientsin, Tsingtao, Tsinan

Siberia—Vladivostok, Alexandrofsky Port

NEW YORK AGENCY :

G. Benenson Investing Building, 165 Broadway, New York City

LONDON REPRESENTATIVE :

Palmerston House, 34 Old Broad Street, London, E.C. 2

Correspondents :

San Francisco, Seattle, New York, London, Paris and in other commercial centers throughout the world



Industrial Bank of Japan, Limited

(NIPPON KOGYO GINKO)

Incorporated by Special Charter in 1902 to Encourage Foreign Investments

CAPITAL SUBSCRIBED Yen 50,000,000

HEAD OFFICE:

7 EIRAKU-CHO, NICHOME, MARUNOUCHI, TOKYO. CABLES "KOGIN," TOKYO

BRANCHES:

TOKYO: NIHONBASHI

OSAKA: KORAIBASHI

KOBE: NAKAMACHI

YEIJIRO ONO, Esq., President

JIUI MATSUMOTO, Esq., Vice-President

DIRECTORS:

KATSUMI IYANAGA, Esq.

ICHIMATSU HORAI, Esq.

KOZO MATSUMOTO, Esq.

KEIKICHI AMANOYA, Esq.

AUDITORS:

TAICHI OBA, Esq.

TEIZO IWASA, Esq.

VISCOUNT TAKAMASA HACHIJO

All descriptions of general banking, exchange, both foreign and domestic, and trust and corporation financial business transacted.

Correspondents in the principal cities at home, and in London, Paris, New York, and San Francisco.

BUSINESS TRANSACTED:

- 1.—Loans on the security of public bonds, of debentures and shares, estates (Zaidan), specified land and buildings.
- 2.—Subscription and underwriting public bonds or debentures.
- 3.—Deposits and safe custody of valuables.

- 4.—Trust company business.
- 5.—Discounting of bills.
- 6.—Foreign exchange business.
- 7.—Other banking business sanctioned by the Minister of State for Finance in accordance with Law of Ordinance.

Hongkong and Shanghai Banking Corporation

(INCORPORATED IN HONGKONG)

Capital:	Authorised Capital	...	...	...	...	...	\$50,000,000
	Issued and fully paid up	...	...	...	...	...	\$20,000,000
Reserve Funds:	Sterling	...	...	...	...	...	£ 6,000,000
	Silver	...	...	...	...	...	\$13,500,000
	Reserve Liability of Proprietors	...	...	...	...	...	\$20,000,000

Court of Directors:

Hon. Mr. D. G. M. BERNARD,
Chairman

A. H. COMPTON, Esq.
Deputy Chairman

W. H. BELL, Esq.

N. S. BROWN, Esq.

A. MACGOWAN, Esq.

C. G. S. MACKIE, Esq.

W. L. PATTENDEN, Esq.

T. G. WEALL, Esq.

H. P. WHITE, Esq.

Head Office:

HONGKONG

Chief Manager:

HONGKONG Hon. Mr. A. C. HYNES.

London Bankers:

THE WESTMINSTER BANK, LIMITED

Shanghai Branch: 12 The Bund

Sub-Agency: 9 Broadway

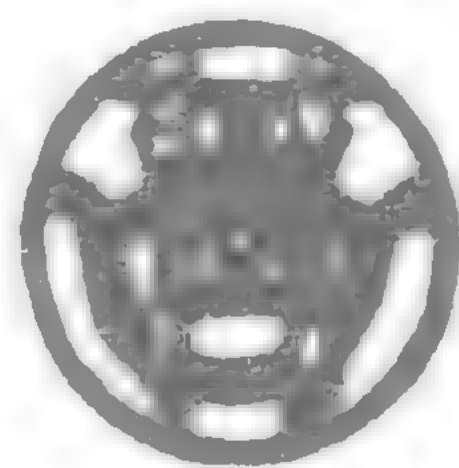
Branches and Agencies:

AMOY	LYONS
BANGKOK	MALACCA
BATAVIA	MANILA
BOMBAY	MOUKDEN
CALCUTTA	NAGASAKI
CANTON	NEW YORK
CHIEFOO	PEKING
COLOMBO	PENANG
DAIREN	RANGOON
FOOCHOW	SAIGON
HAIPHONG	S. FRANCISCO
HAMBURG	SHANGHAI
HANKOW	SINGAPORE
HAIRBIN	SOURABAYA
ILOILO	SUNGEI PATANI
IPOH	TIENTSIN
JOHORE	TOKYO
KOBE	TSINGTAO
KUALALUMPUR	YOKOHAMA
LONDON	

Interest allowed on Current Accounts and on Fixed Deposits according to arrangement.

Local Bills Discounted. Credits granted on approved Securities and every description of Banking and Exchange business transacted. Drafts granted on London and the chief commercial places in Europe, India, Australia, Africa, China, Japan and America. Safe Deposit Boxes to rent. Terms on application.

A. B. LOWSON, Manager.



THE ONE HUNDREDTH BANK, LTD.

(DAI HYAKU GINKO)

ESTABLISHED 1878

HEAD OFFICE: TOKYO, JAPAN

CAPITAL Yen 25,000,000.00

RESERVE FUND AND UNDIVIDED PROFIT . . . Yen 10,935,821.00

KUNIZO HARA, Esq., President

Branches: Yokohama, Kobe, Kyoto, Osaka and 13 Others

Agents and Correspondents: More than 3,000 at Home and Abroad

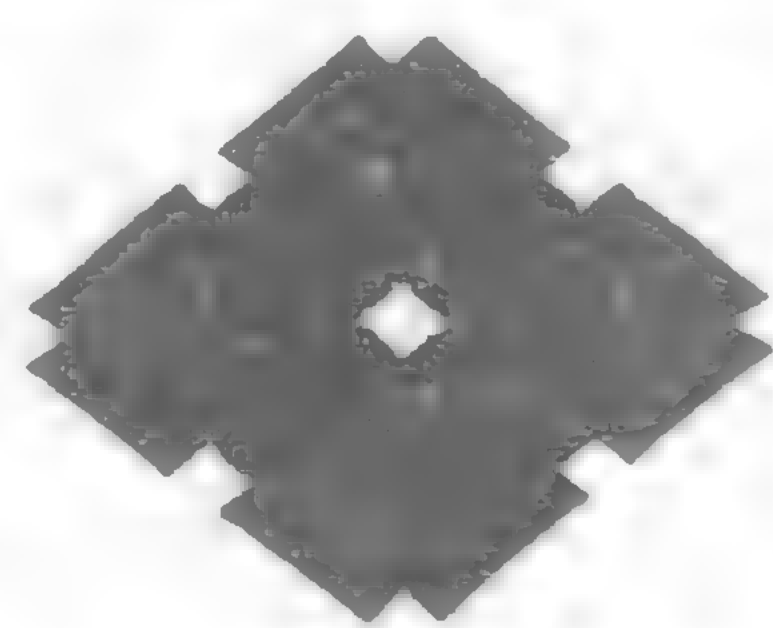
Exceptional Facilities Offered to Banks and Bankers in China
and her Adjacent Countries for Banking and Exchange Business

CORRESPONDENCE INVITED

SEND YOUR BUSINESS TO US

CAPITAL PAID

YEN 150,000,000



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OSAKA, JAPAN

OWNERS OF COPPER MINES, SILVER AND GOLD MINES AND COAL MINES, ETC.

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Forestry Department Osaka

Sales Departments Osaka, Tokyo, Yokosuka, Nagoya,
Kobe, Kure, Hakata and Shanghai

The Sumitomo Steel Works, Limited

OSAKA, JAPAN

Capital Subscribed : Yen 12,000,000

The Sumitomo Electric Wire & Cable Works, Ltd.

OSAKA, JAPAN

Capital Subscribed : Yen 10,000,000

The Sumitomo Steel Tube & Copper Works, Ltd.

OSAKA, JAPAN

Capital Subscribed : Yen 15,000,000

The Sumitomo Fertilizer Works, Limited

Capital Subscribed : Yen 3,000,000

Head Office: Osaka, Japan Works: Niihama, Iyo, Japan

The Tosa Yoshinogawa Hydro-Electric Power Co., Ltd.

Capital Subscribed: Yen 5,000,000

Head Office: Niihama, Iyo, Japan

The Sumitomo Warehouse Company, Limited

Capital Paid : Yen 15,000,000

Head Office: Osaka, Japan Branches: Osaka, Kobe & Tokyo

The Sumitomo Trust Company, Limited

Capital Subscribed: Yen 20,000,000

Head Office: Osaka, Japan Branch : Tokyo, Japan

Authorized to Exercise all Trust Powers for Individuals and Corporations.

The Sumitomo Life Insurance Company, Limited

Capital Subscribed: Yen 1,500,000

OSAKA, JAPAN

The Sumitomo & Ban Colliery Company, Limited

Capital Subscribed: Yen 2,000,000

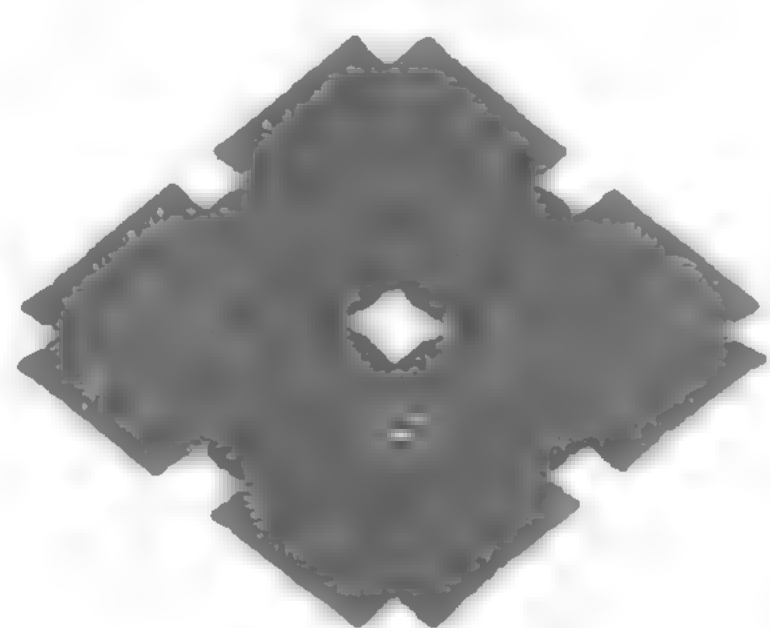
Head Office: Sapporo, Japan Mine: Utashinai, Hokkaido, Japan

The Sumitomo Besshi Mine, Limited

Capital Paid: Yen 15,000,000

Head Office: Niihama, Iyo, Japan Branch: Shisakajima, Iyo, Japan

ESTABLISHED : 1895



INCORPORATED : 1912

THE SUMITOMO BANK, LTD.

KITAHAMA, OSAKA, JAPAN

Subscribed Capital Yen 70,000,000

Paid-up Capital Yen 50,000,000

Reserve Funds Yen 25,430,000

DIRECTORS:

K. YUKAWA, Esq. ... Chairman of Board of Directors
N. YATSUSHIRO, Esq. ... Chief Managing Director
K. KAGA, Esq. ... Managing Director
K. OHDAIRA, Esq.

BARON K. SUMITOMO Director
K. HORI, Esq.
S. IMAMURA, Esq.
S. KOH, Esq.

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Kyoto (3), Kobe (3), Okayama, Onomichi, Niihama,
Kure, Hiroshima (3), Yanai, Shimonoseki, Moji, Kokura,
Wakamatsu, Fukuoka, Kurume (2), Kumamoto.

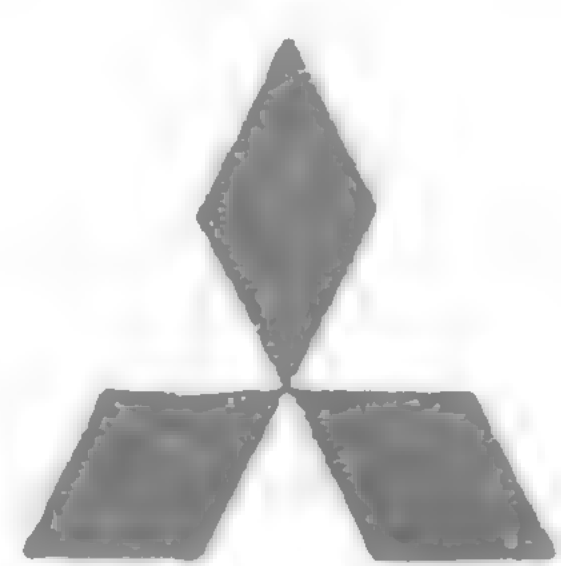
Foreign Branches: London, New York, San Francisco, Los
Angeles, Bombay, Shanghai and Hankow.

Affiliated Banks: The Sumitomo Bank of Hawaii, Limited,
Honolulu. The Sumitomo Bank of Seattle, Seattle. The
Sumitomo Bank of California, Sacramento, Cal.

Bankers: Lloyds Bank, Limited, London. National City Bank
of New York, New York. Lloyds and National Provincial
Foreign Bank, Limited, Paris.

Correspondents: Established in all important places at home
and abroad.

The Bank buys, sells and receives for collection Drafts and Telegraphic Transfers; issues Commercial and Travellers' Letters of Credit available in all important parts of the World, and acts as Trustee for Mortgage Bond, besides doing General Banking Business.



THE
MITSUBISHI
BANK,
LIMITED

CAPITAL SUBSCRIBED - Yen 50,000,000
CAPITAL PAID-UP . . . Yen 30,000,000

CHAIRMAN:

Mr. Manzo Kushida

MANAGING DIRECTORS:

Mr. Kiyoshi Sejimo Mr. Takeo Kato
Mr. Toru Otohe

HEAD OFFICE:

No. 3 Yayasucho Nichome, Kojimachi-ku,
Tokyo, Japan.

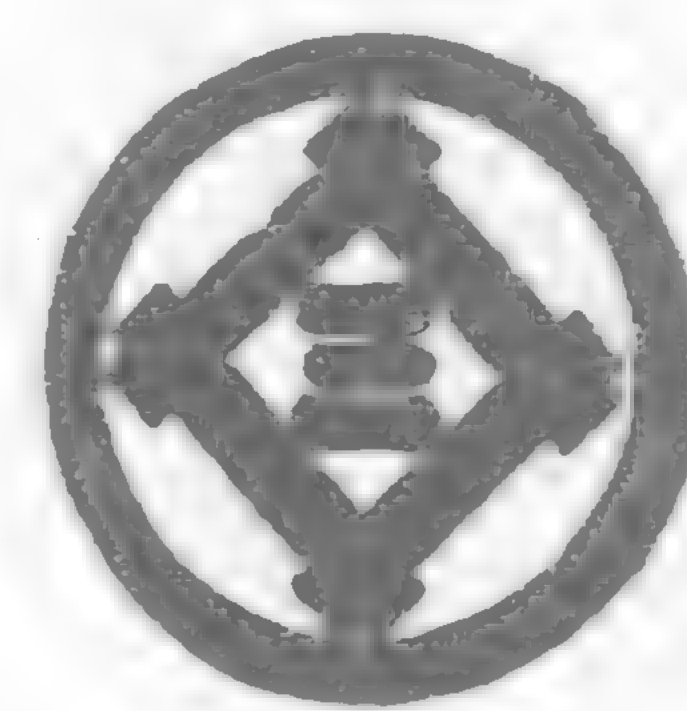
BRANCH OFFICES:

Fukagawa (Tokyo), Tokio Kaijo Building
(Tokyo), Marunouchi Building (Tokyo),
Nihombashi (Tokyo), Osaka, Nakanoshima
(Osaka), Semba (Osaka), Kobe, Sannomiya
(Kobe), Kyoto, Nagoya, Otaru

Shanghai, London and New York.

General Banking and Exchange Business

Agents for the Hongkong and Shanghai Banking
Corporation



THE MITSUI BANK, LTD.

The Oldest Bank in Japan, Founded in 1673

Capital Subscribed... ..Y. 100,000,000.00
Capital Paid-Up.....Y. 60,000,000.00
Reserve Funds (Sep. 1926) .. Y. 55,400,000.00

HEAD OFFICE : TOKYO

No. 5 Honkawayacho, Nihonbashi-ku

Home Branches:

FUKUOKA, HIROSHIMA, KOBE, KYOTO,
MARUNOUCHI (Tokyo), MOJI, NAGASAKI,
NAGOYA, NIHONBASHI (Tokyo), OSAKA,
OSAKA-DOJIMA, OSAKA-KAWAGUCHI,
OSAKA-NISHI, OTARU, SHIMONOSEKI,
WAKAMATSU (Kyushu), YOKOHAMA.

Foreign Branches:

Bombay, London, New York, Shanghai,
Sourabaya.

London Bankers:

Barclay's Bank, Ltd. Midland Bank, Ltd.

New York Bankers:

Bankers Trust Co. Chase National Bank.
National City Bank of New York.

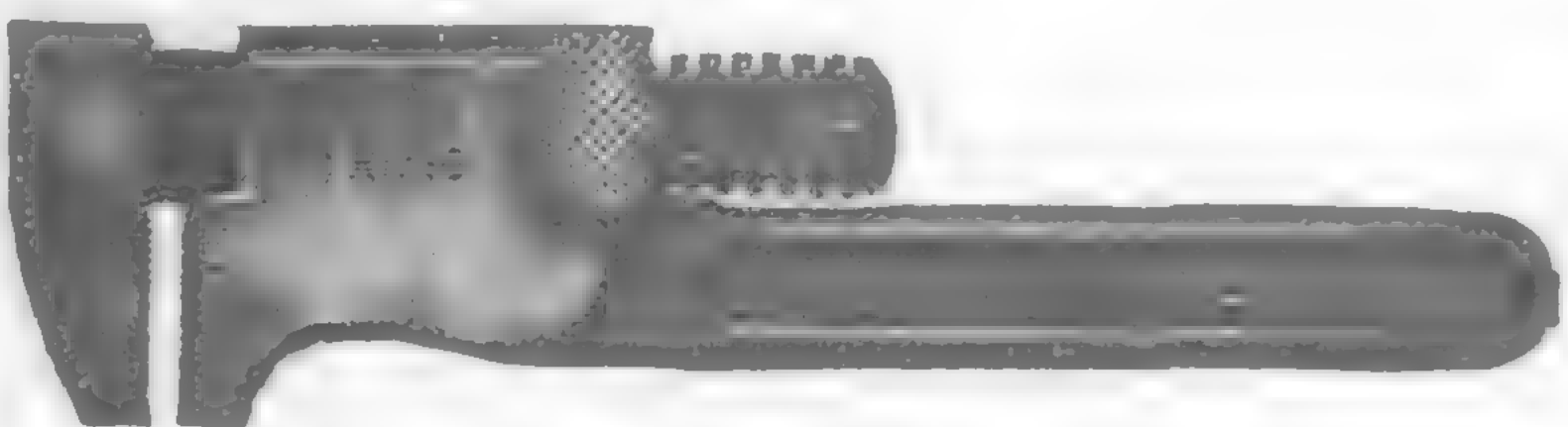
TRIMO TOOLS



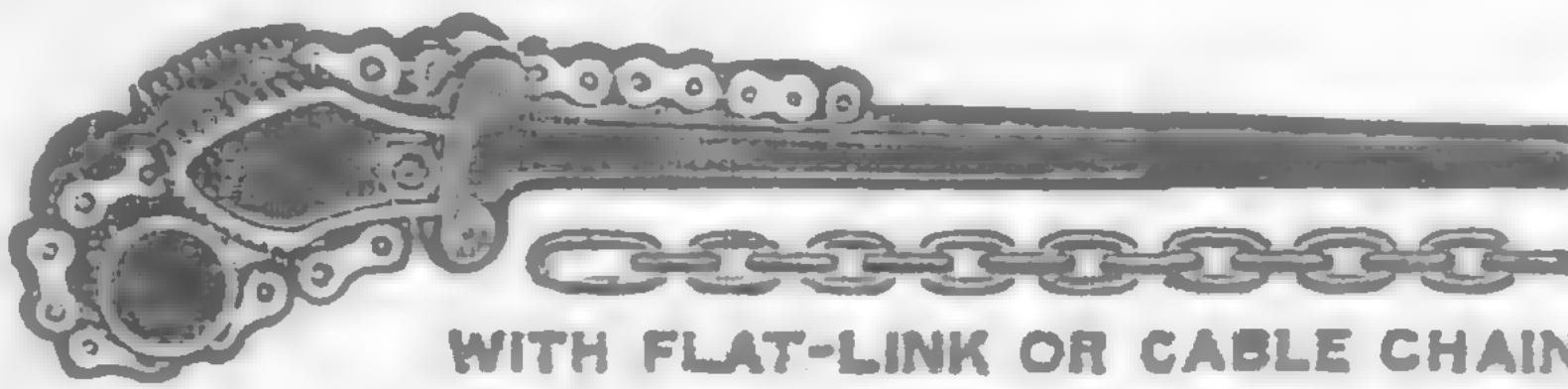
Trimo Pipe Wrench
in 8 sizes take pipe up to 8 inches



Trimo Pipe Cutter
in 3 sizes cut pipe up to 3 inches



Trimo Monkey Wrench
made in 7 sizes—6-in. to 21-in.



WITH FLAT-LINK OR CABLE CHAIN
Trimo Chain Wrench
in 8 sizes take pipe up to 16 inches

These four superior tools should be in the hands of every user and on the shelves of every seller.

They are made on honor and sold fully guaranteed by the manufacturer.

Can be had through any importer of hardware.

Manufactured By:

TRIMONT MANUFACTURING CO.

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THE BANK OF TAIWAN, LTD.

Established 1899

President: Shigeru Shimada, Esq.

Directors:

Tadasu Hisamune, Esq.

Massajiro Araki, Esq.

Naokichi Yanagita, Esq.

Naomichi Takagi, Esq.

Tsutomu Yoshida, Esq.

Head Office: Taipeh.

T. Egami, Esq., Manager.

Tokyo Branch:

No. 1 Nichome, Eiraku-cho, Kojimachi-ku

N. Uda, Esq., Manager.

Branches and Agencies:

Japan: Tokyo, Kobe, Osaka, Yokohama.

Taiwan: Giran, Heito, Kagi, Karenko, Keelung, Makong, Nanto, Taichu, Tainan, Takao, Taito, Tamsui, Toen, Shinchiku.

China: Amoy, Canton, Foochow, Shanghai, Swatow.

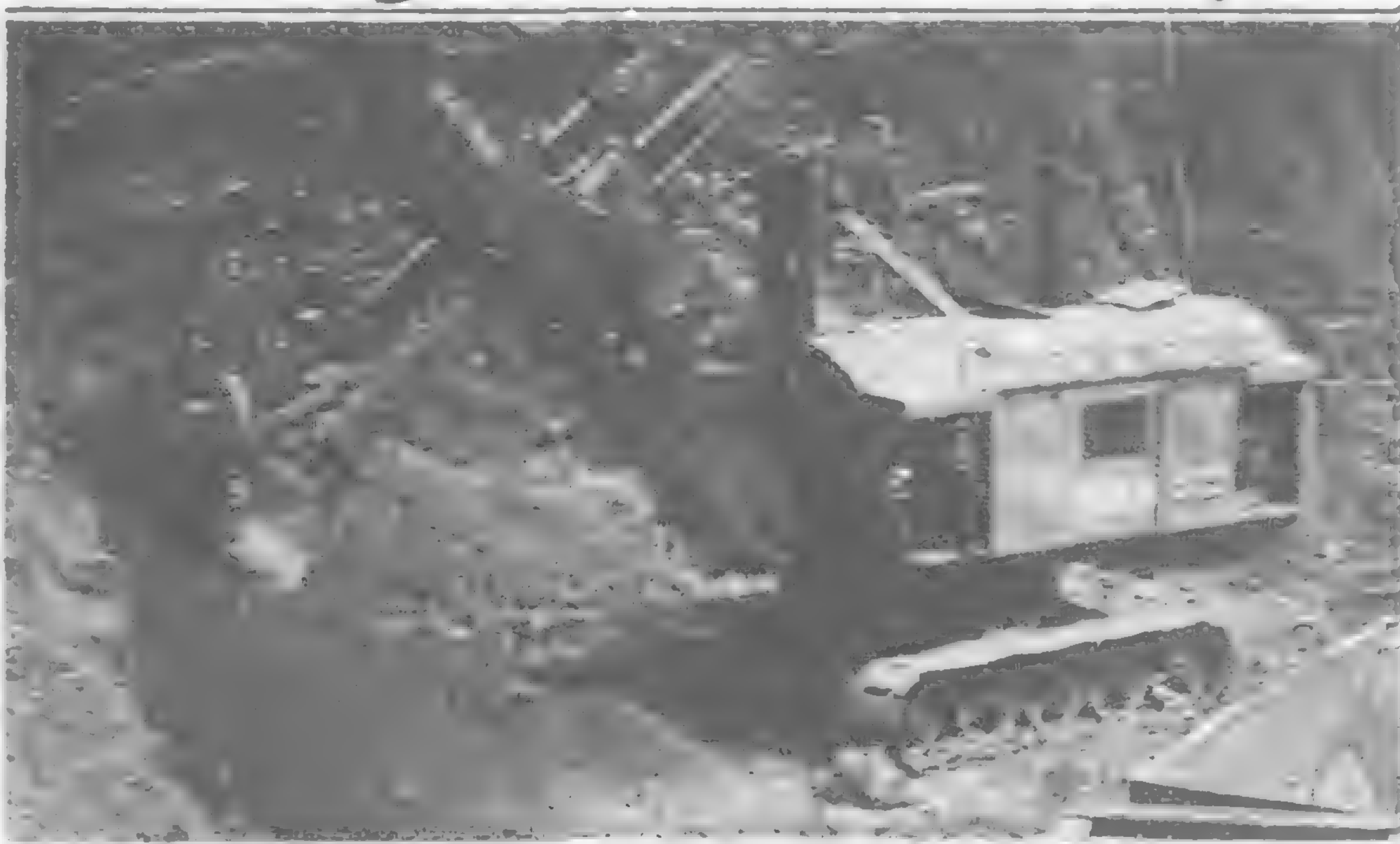
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India: Bombay, Calcutta.

London, New York, Hongkong, Singapore.

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4-Yard Full Revolving Electric Shovel

The Bucyrus 120-B Electric Shovel Provides A New and Cheaper Method For Digging Greater Tonnages Per Day In Mine and Quarry

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BUCYRUS

Established in 1880

Trade Mark Registered

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General View of Hidachi Engineering Works

Location of Plant :

SUKEGAWA, IBARAKI PREFECTURE, JAPAN.

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KUHARA MINING COMPANY OFFICES, 90 NICHOME, KITAHAMA, HIGASHI-KU, OSAKA.

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Also Agents for Hoden Oil, Used for Transformers.

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TURNS
POLITICALLY, ECONOMICALLY, ARTISTICALLY
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JAPAN
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Oriental charms are jealously preserved intact
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TOURISTS ARE ASSURED
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JAPANESE GOVERNMENT RAILWAYS

JAPANESE GOVERNMENT RAILWAYS

The Beauty, Fascination, and Mystery
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Passengers.

For particulars please apply to the

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Cable Address: "TETSUDOSHO" TOKYO, JAPAN



South Manchuria Railway



Open Cut, Fushun Collieries

FUSHUN COAL

The Best Steam Coal in the Far East. Fresh Stocks Always on Hand.

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Agencies :

Chefoo
Manila
Batavia
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Moji
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Nagoya
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Also Sulphate of Ammonia, Fire Clay, and Talc

Pamphlets and Particulars gratis from any of the above Depots and Agencies, and from the

Mining Department :

SOUTH MANCHURIA RAILWAY COMPANY, DAIREN



South Manchuria Railway



Dairen Wharves

DAIREN WHARVES

On the Second Wharf, Dairen, is a Waiting Station with accommodations for 5,000 people and containing the Bank of Chosen Exchange, Osaka Shosen Kaisha's Ticket Office, Dairen Kisen Kaisha's Ticket Office, Information Bureau, Shops, Dining Room, Special Waiting Room, Ladies' Waiting Room, Exhibits of Manchurian and Mongolian Products, Barber Shop, etc.

Passengers embark by means of a Portable Platform direct from the Station. Both the Dairen Wharf Office Building and the Waiting Station are built of reinforced concrete, and are the best of their kind in the Far East in point of architectural beauty.

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MAIN LINE Dairen to Changchun, via Mukden. Antung to Mukden

BRANCH LINES Dairen to Port Arthur, Tashihchiao to Yingkou (Newchwang), Hunho to Fushun

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AT CHANGCHUN:—Kirin-Changchun Line of the Chinese Government Railways (3 hours and a half only by Express between CHANGCHUN and KIRIN).

AT MUKDEN:—Peking-Mukden Line of the Chinese Government Railways (24 hours only by Express between MUKDEN and PEKING).

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AT ANTUNG:—The Chosen Railway of the Japanese Government Railways (22 hours and a half only by Express between ANTUNG and FUSAN).

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Head Office: DAIREN

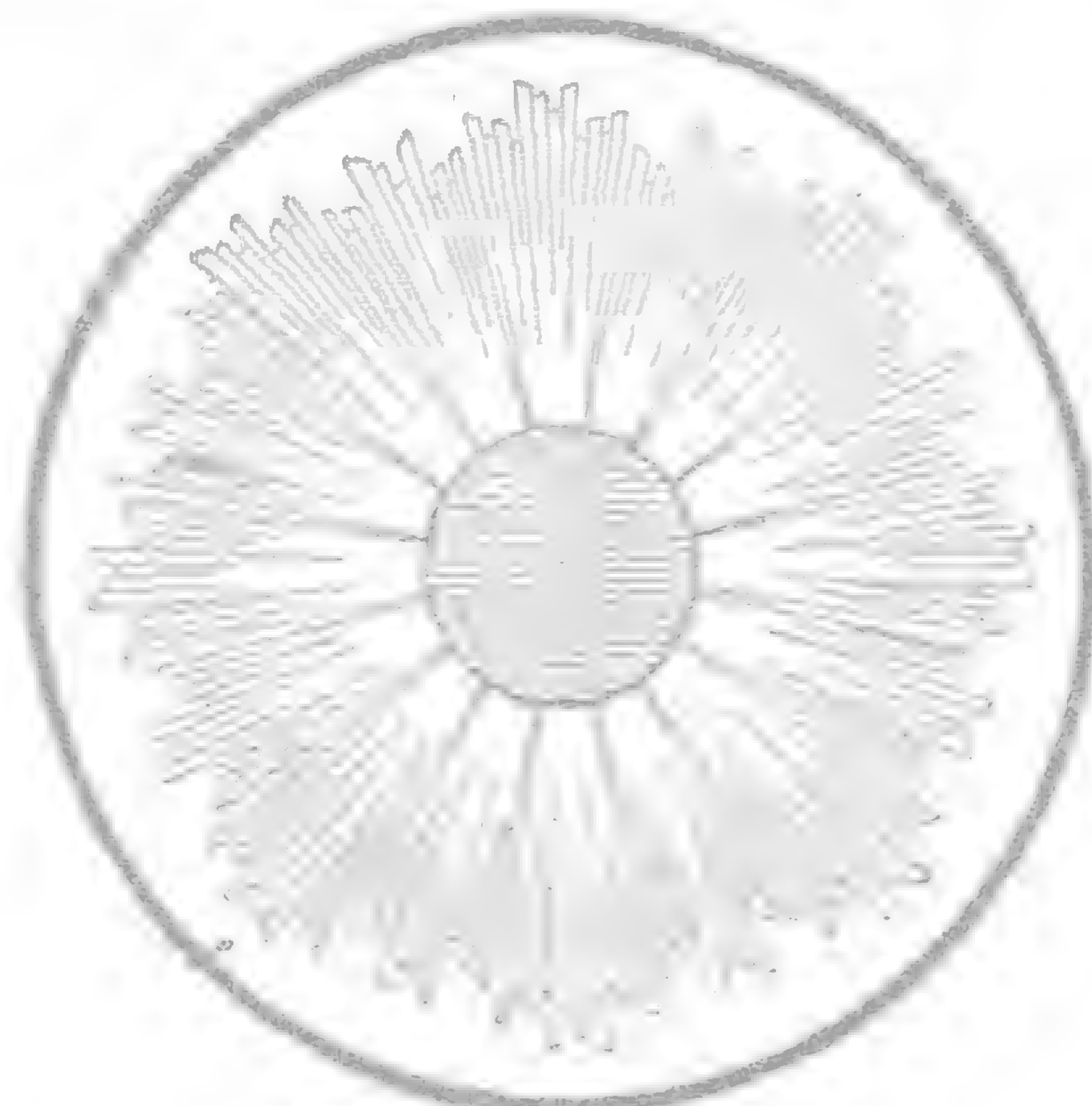
Branch Offices: TOKYO, OSAKA, SHIMONOSEKI, SHANGHAI, HARBIN, KIRIN, PEKING AND NEW YORK

Cab. Add.: "MANTETSU" or "CMRCO"

Codes: A.B.C. 5th & 6th Ed., Lieber's and Bentley's

Capital (Fully Paid-Up):
Yen 100,000,000

Reserve Fund:
Yen 96,500,000



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COMMERCIAL CITIES
IN THE WORLD

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Established 1880

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Vice-President: KIMPEI TAKEUCHI
MASUNOSUKE ODAGIRI
BARON KOYATA IWASAKI
KONOJO TATSUMI
FUKUSABURO WATANABE
BARON KAISAKU MORIMURA

REITARO ICHINOMIYA
TARO HODSUMI
KUNIZO MOGAMI
NAOZO IGARASHI
TOSHIKATA OKUBO
YAKICHI SUITSU

Head Office: YOKOHAMA

Manager: N. Otsuka

TOKYO BRANCH

No. 5 Honryogaecho, Nihonbashi-ku,
Manager: E. TSUYAMA

Marunouchi Agency

No. 1. Nichome, Eirakuchō, Kojimachi-ku.
Agent: E. Tsuyama

SHANGHAI BRANCH

No. 24 The Bund
Manager: G. HASHIDZUME

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Alexandria (Egypt)	Hamburg	Los Angeles	Rangoon	Sourabaya
Batavia	Hankow	Lyons	Rio de Janeiro	Sydney
Bombay	Harbin	Manila	Saigon	Tientsin
Buenos Aires	Hongkong	Nagasaki	San Francisco	Tsinanfu
Calcutta	Honolulu	Nagoya	Seattle	Tsingtao
Canton	Kaiyuen	Newchwang	Semarang	Vladivostok
Changehun	Karachi	New York	Shanghai	(Temporarily closed)
Dairen (Dalny)	Kobe	Osaka	Shimonoseki	
Fengtien	London	Peking	Singapore	

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Interest allowed on Current Accounts and Fixed Deposits on terms to be ascertained on application.
Every description of Banking business transacted.
For particulars, apply to the Managers.



More than 23 times Around the Earth

581,139 miles—veterans, surely—this pair of 36 inch Carnegie Wrought Steel Wheels. Placed in service September, 1913 under an all-steel passenger coach weighing 74.6 tons, they were finally removed May, 1921. And they were on the same axle from the time placed in service until mounted on this shortened axle for exhibition.

Mileage such as this demonstrates the economy of Carnegie Wrought Steel Wheels.

Manufactured by Carnegie Steel Company

UNITED STATES STEEL PRODUCTS CO.

EXPORT REPRESENTATIVES.

Shanghai Office: Union Building, 1 Canton Road
Cable Address: "Steelmaker, Shanghai."

Tokyo Office: Yusen Building, Marunouchi

The Far Eastern Review

ENGINEERING

FINANCE

COMMERCE

VOL. XXIV

SHANGHAI, JANUARY, 1928

No. 1

Japan in Manchuria

China's Protests Against the South Manchuria Railway Loan Creates an Issue that may Lead to War

By Geo. Bronson Rea.

"We believe in Japan. We believe in her peaceful intentions; we believe in her courage, her patience, her good-faith, her loyal friendship for America," declared Mr. Thomas W. Lamont in his parting message to the Japanese people. In these words, Mr. Lamont correctly reflected the attitude of the American people towards the Japanese to-day. The slate is wiped clean. No amount of Chinese propaganda can ever again disturb the cordial relations between these two great nations. Economic and financial co-operation have created ties of friendship and common interest that cannot be severed by the clamor of Chinese school-boys and patriotic demonstrations.

FOLLOWING closely on the heels of the Democratic attack on the State Department's supervision over foreign loans early last month, comes the hullabaloo over a proposed American loan to the Japanese South Manchuria Railway Company. In this instance, however, the attempt to influence the policy of the State Department comes from the Chinese, who, so far, have been very careful to avoid giving their protests an official character. The publicity campaign against the proposed loan follows closely the tactics employed by the Chinese over the Shantung Decision in 1919, which succeeded in this country, simply because the Senate welcomed any argument that might help defeat the Peace Treaty. Much water has passed under the bridges since 1919. No longer is it possible for Chinese student, labor and commercial organizations to sway American opinion through mass propaganda. It worked once. It cannot be worked again.

The American Government of to-day is directed by a group of clear-thinking men whose attitude towards China and Japan [is influenced by the realities. Never before have the relations between the United



Harris & Ewing

Frank B. Kellogg

States and Japan been so friendly. There is no friction. The policies of both nations towards China are identical. A fixed regard for international law as laid down by the treaties has superseded the hysteria and sentiment that played such a large part in determining the Far Eastern policy of a former administration. For China to obtain even the friendly intervention of the present Administration in any dispute with Japan, her case would have to be built up on the treaties and presented officially through recognized diplomatic channels. The American Government cannot be influenced or intimidated by student protests or by the resolutions of unofficial bodies directed to the President of the United States or to the State Department by the citizens of a foreign country.

For the Chinese Chamber of Commerce of Chapei, the Chinese Bankers' Association and other organizations to pass resolutions and transmit them direct to any official or department of the American Government is a breach of the established rules governing international relations, an impertinence which the Chinese alone seem to indulge in. During the crisis over China

in the early part of the year, one Chinese organization in New York sent several telegrams to the President of the United States and when no answer was received, repeated all its previous telegrams at length winding up with a peremptory; "please reply." This disregard for the proprieties reached a climax recently when the Chinese Students Club of Columbia University passed resolutions against the proposed South Manchuria Railway loan and forwarded letters of protest to Secretary Kellogg and the Foreign Affairs Committees of the Senate and House of Representatives. It is obvious that the Chinese Minister at Washington could not officially transmit these protests to the State Department without creating an issue with Japan over her treaty rights in Manchuria.

The question of an American loan to the South Manchuria Railway Company is a purely commercial one, which the State Department has no legal power to prohibit. The American bankers consider the terms and security adequate and desire to underwrite such a loan and offer the bonds on the market, they would, purely as a matter of form, submit their prospectus to the State Department and be guided largely by its advice on the political effects of the loan, but the State Department could not legally oppose the loan or forbid its flotation. As the rights of the South Manchuria Railway Company are clearly defined and firmly established by treaties, the State Department could not object to the loan without involving the American Government in a dispute with Japan over a matter in which it has no right to interfere. The attempt on the part of the Chinese to throw upon the American Government the burden of their fight with Japan over her position in Manchuria is resented by many highly placed men in Washington, for not only does it try to force the United States to stand as the champion of China, but

by inference, it is an insult to the good-faith of the government and bankers. It goes without saying that American financial co-operation with Japan in Manchuria through a corporation legally operating within the treaties, is the strongest guarantee that China's sovereign rights will be fully respected. To infer otherwise, is to impugn the good-faith not only of Japan but of the United States.

It has taken seven years of hard diplomacy and mutual sacrifices for the United States and Japan to understand each other. This understanding is the one guarantee of peace in the Pacific. Japan is not going to sacrifice this hard won position and lose her friendship with the United States over such a trifling matter as a loan to the South Manchuria Railway Company. American capital might

prefer to co-operate with the Chinese in the development of their resources and would welcome the opportunity to do so if there was a stable government to deal with. Until the treaties are revised and the agreements and concessions now pooled in the Consortium are annulled, Japan has certain well defined rights in Manchuria which no outside nation can ignore. The American Group in the consortium is committed to recognize these rights.

The Chinese fail to realize that if Japan was intent upon impairing her sovereignty in Manchuria she would hardly invite public scrutiny of her plans by advertising a foreign loan for the South Manchuria Railway. The Japanese Government, which holds half the shares in this enterprise, can obtain all the money it requires on very favorable terms, without specifying its use. If Japan was endeavoring to advance an imperialistic program in Manchuria through the instrumentality of a loan to the South Manchuria Railway Company, it could easily find the money either at home or abroad without inviting the opposition of the Chinese. The Chinese must understand that they could not reasonably object to an American loan to the Japanese Government and in protesting against the proposed loan to the South Manchuria Railway Company, they simply create a situation which would influence Japan to finance her object through other channels. The mere fact that the South Manchuria Railway Company as a private enterprise has considered raising a loan in the United States for

its needs, is clear evidence that the Japanese Government has no ulterior motives in Manchuria. The small amount of the proposed loan, more than half of which would be devoted to refunding purposes and the balance for improving the railway's equipment and developing industrial enterprises precludes its being used for political purposes. To deny to the South Manchuria Railway the

THE SECRET TREATY

ARTICLE I.

Every aggression directed by Japan, whether against Russian territory in Eastern Asia, or against the territory of China or that of Korea, shall be regarded as necessarily bringing about the immediate application of the present treaty.

In this case the two High Contracting Parties engage to support each other reciprocally by all the land and sea forces of which they can dispose at that moment, and to assist each other as much as possible for the victualling of their respective forces.

ARTICLE II.

As soon as the two High Contracting Parties shall be engaged in common action no treaty of peace with the adverse party can be concluded by one of them without the assent of the other.

ARTICLE III.

During the military operations all the ports of China shall, in case of necessity, be open to Russian warships, which shall find there on the part of the Chinese authorities all the assistance of which they may stand in need.

ARTICLE IV.

In order to facilitate the access of the Russian land troops to the menaced points, and to ensure their means of subsistence, the Chinese Government consents to the construction of a railway line across the Chinese provinces of the Amur and of Guirin (Kirin) in the direction of Vladivostok. The junction of this railway with the Russian railway shall not serve as a pretext for any encroachment on Chinese territory nor for any infringement of the rights of sovereignty of his Majesty the Emperor of China. The construction and exploitation of this railway shall be accorded to the Russo-Chinese Bank, and the clauses of the contract which shall be concluded for this purpose shall be duly discussed between the Chinese Minister in St. Petersburg and the Russo-Chinese Bank.

ARTICLE V.

It is understood that in time of war, as indicated in Article I., Russia shall have the free use of the railway mentioned in Article IV. for the transport and provisioning of her troops. In time of peace Russia shall have the same right for the transit of her troops and stores, with stoppages, which shall not be justified by any other motive than the needs of the transport service.

ARTICLE VI.

The present treaty shall come into force on the day when the contract stipulated in Article IV shall have been confirmed by his Majesty the Emperor of China. It shall have from then force and value for a period of fifteen years. Six months before the expiration of this term the two High Contracting Parties shall deliberate concerning the prolongation of this treaty.

right to raise a loan in the financial markets of the world is to discriminate against a corporation legally entitled to this privilege.

As Secretary Kellogg pointed out in an interview with the newspapermen, as long as the Open Door doctrine is not infringed, the American Government could not object to the loan. The Chinese should bear in mind that the South Manchuria Railway Company in this respect enjoys a good-will in the United States that will outweigh any propaganda against it. American manufacturers do not forget that this railway has purchased materials in this country to the extent of \$75,000,000, without counting the materials sold to private Japanese enterprises in Manchuria. All this without lending them a dollar. When the market was closed to American manufacturers on practically every other loan-built railway in China, the only Open Door for our railway material was in Manchuria. There is every just reason why American bankers should reciprocate and lend money to the one railway in Asia that has adopted American standards and created such a valuable market for our manufacturers.

All this mass propaganda calculated to influence the American Government to prohibit the flotation of a purely commercial loan can only result in increasing opposition to the State Department's supervision over such matters. The Chinese activities may well bring about a situation that would defeat the very object they



Count Cassini who was Dominant in Peking
at the time under Discussion

have in view, for these protests bring forcibly to the attention of the American people the warning of Senator Carter Glass against further intervention of the State Department in such matters. Here we have a concrete case where, by acting on such protests, the American Government would be brought into sharp conflict with a friendly nation over an issue which does not concern us. The fact that the incident has occurred, provides additional ammunition to an influential group opposed to the present practice and, if the State Department should be deprived of all authority to supervise or pass on foreign loans, the way would be open for the South Manchuria Railway to float any amount of loans in this country without the bankers being obliged to submit their prospectuses for inspection. If the lid is taken off, Japan with her excellent credit can obtain all the money she wants in this country, while China would be out of luck.

The Chinese insist that Japan's rights in Manchuria are invalid because they were extracted under pressure at the time of the Twenty One-Demands. This question was thoroughly threshed out at the Washington Conference, where Japan refused to budge from her position. Whether the 1915 treaty is valid or invalid, it stands. It is no concern of the American Government. The issue is clearly one between China and Japan and, if the principle underlying the

Chinese position is admitted, an extremely dangerous precedent would be established. Some very recent wars would have to be fought all over again, and many established rights surrendered. The Chinese, however, are on strong ground when they rest their case against Japan on the Twenty-One Demands. Until such time as the inside history of the Demands are revealed by some Japanese statesman Japan stands before the world as the aggressor. Okuma, Kato and Hioki, the principal Japanese actors in presenting the demands are dead. Yuan Shih-kai is dead. Dr. Sun Yat-sen repeatedly declared that the demands were a put-up job, invited and even drafted by Yuan himself, the price he was willing to pay Japan for recognizing him as Emperor.

In any discussion over Manchuria, the reason for Japan's presence there is bound to be considered. What is Japan doing in Manchuria? And when we go behind the Twenty One Demands to the Portsmouth Peace Treaty, to the Russo-Japanese War and the causes which led up to it, the picture changes. The Chinese fail to understand, or understanding, refuse to face the fact that at the Washington Conference, their chief delegate, Dr. Wellington Koo, filed with the Secretary of State a document that was read out in open session and now forms part of the official records of that conference. This document was the abridged text of the secret treaty of alliance between China and Russia signed at St. Petersburg in May 1896 and which places upon China the responsibility of voluntarily surrendering her sovereignty in Manchuria to her Ally in order that Japan might be punished for her recent victory over China.

In the full text of the treaty, the character of the railway is more clearly defined. "*In order to facilitate the access of the Russian land troops to the menaced points and to ensure their means of subsistence, the Chinese Government consents to the construction of a railway across the Provinces of the Amur and Kirin in the direction of Vladivostok.*" The Chinese Eastern Railway and its South Manchuria Branch were therefore essentially and primarily military in character, constructed for the express purpose of transporting the Russian armies to strategic points in Chinese territory as the first step in a war with Japan. The terms of the carefully camouflaged commercial concession for the construction and operation of the line signed four months later were given full publicity, but the Master Treaty defining its real purpose was maintained a profound secret. On the signing of the innocuous commercial convention, the main treaty of alliance became operative. From this point dates most of China's subsequent woes.

China faithfully discharged her commitments under the treaty and two years later, after receiving the sum of Tael 500,000, Li Hung-chang leased the Liaotung Peninsula to Russia and extended the Chinese Eastern Railway from Harbin to Port Arthur. Within two years, this deep water port was converted into an impregnable naval base, the headquarters of a powerful Russian fleet in the Pacific, a direct threat to the British empire in Asia. Russian armies poured into Manchuria and occupied all the strategic centers. The province was created into a Russian viceroyalty, closed to foreign trade and held as a private Russian preserve. Caught between the giant jaws of the Russian nut-cracker, Japan was forced to fight to preserve her independence. The rest is history.

China went through the farce of proclaiming her neutrality warning the combatants that her sovereign rights and territory in the Three Eastern Provinces must be restored to her no matter which belligerent should be victorious. At the end of the war, Japan went to Portsmouth in complete ignorance of the existence of the secret treaty of alliance between China and Russia, and was compelled to forego her demands for a cash indemnity that would have compensated her in part for her tremendous sacrifices. Japan was forced to accept as the main spoils of victory, the Russian rights to the South Manchuria Railway, a broad guage line that had been systematically destroyed by the Russians in their retreat northwards. Over the torn up road bed and temporary bridges the Japanese army had hastily laid a light narrow guage military line totally inadequate for handling the commerce of the territory. In other words, Japan got nothing but a short-term franchise to a railway right of way and had to start in immediately to rebuild and equip an entirely new line. It is difficult to moralize or speculate on what might have been, but it is fair to assume that had the terms of the Li-Lobanoff secret treaty of alliance been known at Portsmouth, China would have had to pay any indemnity Japan may have demanded or imposed. It is also fair to assume, that this would have taken the form of a complete cession of China's

sovereignty over South Manchuria. The full responsibility for the Russo-Japanese War rests squarely upon the shoulders of the nation which made it possible. Now, when China's tardy official confession forms a part of the public records, Japan in justified in demanding the indemnity she was buncoed out of at Portsmouth through the operation of secret diplomacy. There is no statute of limitations to shield a nation from the consequences of its acts. No other self-respecting nation of fighting men, would meekly forego its right to demand compensation for a war which bled them white when the truth surrounding its causes became known. That Japan has not pressed China for a reopening of the whole Manchurian question and the payment of an indemnity is one of the strongest proofs of her forbearance and sincere desire to remain on friendly terms with her great neighbor.

It is true that China was duped by her Ally. Russia's treatment of China after she got what she wanted stands as one of the most despicable betrayals in history. The Chinese people knew nothing of the alliance entered into by their Manchu rulers. China's official copy of the secret treaty was not even permitted to enter the archives of the Tsung-li yamen, being concealed in the private safe of the Empress Dowager in her sleeping apartment in the Forbidden Palace. Russia cynically violated the treaty and perhaps rendered it null and void by her actions in 1900, but the fact remains that China faithfully fulfilled her part of the bargain. The railway the Chinese now glibly denounce as the instrument of Japan's imperialistic designs in Manchuria and Mongolia was constructed originally with China's consent in Chinese territory as the instrument for crushing the independence of Japan. That Japan is not a vassal of Russia to-day is no fault of China's. Japan paid for her rights to the South Manchuria Railway with the lives of over 200,000 of her sons and bankrupted herself in the bargain. China can never repay Japan for her sacrifices in 1904. Manchuria is watered by the blood of Japanese patriots; their graves and battle monuments dot the landscape from Port Arthur to Mukden. The land may belong to China, but it is hallowed soil for the sons of Nippon.

China may question the fundamental validity of the 1915 treaties which extends the Liaotung Lease and the railway rights to 99 years; she may declare May 7 the date on which they were signed as a National Humiliation Day and continue to protest against Japan's presence in Manchuria, but in time this spirit will lead to a show-down. The peace of the Far East hinges on how this question is settled. Any settlement must be based on an intelligent presentation of the facts. Japan's position is weak as long as her case rests on the 1915 treaties on the other hand China's position is undermined once we go behind that period. Japan has taken no advantage of her undoubtedly strong legal position. She has refused to hold China responsible for the acts of the Manchu government in provoking the Russo-Japanese War. She fought the war and restored to the Manchus their sovereignty over a vast territory which by all recognized laws of warfare they had forfeited. Japan is willing to abide by the treaties as they stand and develop Manchuria for the benefit of both nations, but if the Chinese refuse to admit the legality of her position and persist in raising the issue and dragging the United States into her quarrel, some day the patience of Japan will become exhausted.

When Japan presents her full case to the world and explains the reasons which brought her into Manchuria and the reasons why she intends to remain there, public opinion in the United States will side with her. Until China voluntarily confesses her mistakes and approaches Japan in a friendly spirit for a just settlement of the dispute over Manchuria, it is hopeless to expect that Japan will budge from her present position. Japanese properties in Manchuria are valued at over three billion yen. Outside of the South Manchuria Railway, hardly any of her enterprises in that territory have returned a fair rate of profit on the investment. In nearly every case her capital has gone into the capacious pockets of the Chinese, either in the form of "squeeze" to the officials, through the failure of the Chinese to permit the profitable operation of the enterprise, or indirectly in benefits to the Chinese farmers and traders. The prosperity of Manchuria which has permitted Chang Tso-lin to carry on his wars the other side of the Wall, is due entirely to the presence of the Japanese and their determination to keep the railway zone free from disorder. Every right that Japan has obtained in Manchuria outside of the main railway has been paid for in cash. To date, Japan has been the exploited. She has not complained. She has been building for the future, content to forego

immediate profits in the hope of indirect gains through the normal development of trade, agriculture and industry that will bring increased revenues to her railway.

Perhaps Japan acted hastily in the matter of the Twenty-One Demands. She had great provocation. Her position under the 1915 treaties may be shaky and open to criticism, but no fair-minded person with a full knowledge of the events which led up to the Russo-Japanese War, will deny to her the right to recoup out of the South Manchuria Railway traffic receipts, her enormous expenditures in a war brought about through China's own stupidity and thirst for revenge. The protection of this railway against competition by parallel lines is Japan's sole guarantee that she will be permitted to collect in part the indemnity from China that is fairly coming to her. It is also her only guarantee that China will not renew in some form her old understanding with Russia and seek to drive her out of Manchuria and Korea.

Some day, China will emerge from her present troubles, a strong, united nation, competent to discharge her international obligations and defend her territory against aggression from the outside. That day, however, will not come during the life of the present generation. Before China can fairly ask the Japanese to discuss the Manchurian problem, she will have to re-establish her authority over Outer Mongolia and enforce her right to colonize a territory which Russian policy insists must be maintained as a buffer state closed to Chinese colonization and development. For twenty or more centuries, the Chinese have peacefully existed behind the protection of the Great Wall. The erection of this thousand mile barrier against the Hunnish hordes deflected their pressure ever westwards and in time this pressure brought about the downfall of Rome. After twenty centuries, the Chinese are now emerging from their isolation and seclusion and in turn are pressing northwards, driving the Mongol nomads from their pastures and organizing their lands into prefectures ruled from Peking. The exodus into Manchuria caused by the prolonged civil war and insecurity in China Proper is beginning to assume the character of one of the most remarkable migrations in history. Manchuria will fill up with peaceful Chinese farmers and traders. They will prosper, multiply rapidly and spread deeper and deeper into Mongolia depriving more and more the hardy Mongolians of their grazing lands. From time immemorial the Nemesis of China came from the North. For centuries her independence has been safeguarded by the Wall which kept the barbarian horsemen from raiding and conquering the border provinces. The Chinese are now departing from their ages-old traditions, pushing themselves into the lands of their historical enemies. For Manchuria is not China. It is the homeland of China's conquerors. If Shantung is the "Sacred Province" of China Proper, Manchuria is the Holy Land of a race of warriors whose emperors and fighting generals lie buried in the many splendid mausoleums that still stand near Fengtien as a memorial to their greatness. Manchuria was never a part of China until the Three Eastern Provinces were organized into a viceroyalty after the Russo-Japanese War and Chinese officials for the first time superseded the Tartar Generals who ruled the provinces in the name of their Emperor at Peking. As long as the Manchus ruled China, their homeland was part of the Empire, and up to the beginning of this century the territory was closed to Chinese colonization by Imperial Edict. The absorption of Manchuria into the Chinese Republic as an integral part of China Proper was possible only because the Manchus had lost their fighting powers and were denied the foreign loans that would have enabled them to hold their own. This appropriation or peaceful conquest of a territory over which no Chinese had ever before exercised authority or had dared to penetrate in large numbers stands as one of the most astounding examples of imperialism in recent history. There is sound reason behind Japan's contention that Manchuria is historically distinct from China Proper.

The right of the Manchu emperor and princes to rule over their own homeland and peoples may well develop into a question of supreme importance to the Chinese, especially if the rights of the Manchus are supported by Japan. The Manchu Prince Regent abdicated his throne and powers in favor of a Republic which in turn guaranteed to pay him a stipulated annual sum and permit him to reside unmolested in the Forbidden City. The Chinese Republic has broken this solemn contract and even despoiled the Manchus of their own homeland. The Chinese raised no wail of protest against Russia's rape of Mongolia. Russia simply urged the Mongolians to declare their independence and then recognized

them immediately in the same manner that the United States recognized the Republic of Panama and then purchased the Canal rights from the new Government.

If the Chinese persist in raising the issue of Japan's rights in Manchuria, the Japanese in addition to the dynastic rights and claims of the Manchus, have the precedent of Panama and Mongolia to justify her in supporting the Manchus in declaring their independence of Peking and then entering into an alliance with the new state for mutual protection against Russia, in the same manner that Russia, to-day stands behind the Republic of Mongolia in defiance of the open door treaties guaranteeing the integrity of the Chinese Empire. Here we have a tangle that might reasonably prevent the United States from protesting against a new line-up in Eastern Asia. The territorial integrity of the old Chinese Empire has been violated by the amputation of Mongolia and we raised no voice in protest. Could we protest against the independence of Manchuria and the restoration of their sovereignty over this territory to the Manchu princes? We certainly would not intervene in Russia against any movement to revive the Empire, neither would we intervene in Germany or any other European country over similar matters. If we are not justified in meddling in Europe, how much less right would we have to interfere with the restoration of Manchu sovereignty over their own country?

There is another angle to this problem. There is no love lost between the Mongols and the Chinese. The Mongols and Manchus understand each other; they belong to the same breed. Now Russia, whether Czarist or Soviet will never quietly consent to the

Chinese becoming a menace to her position in Central Asia. Sooner or later, the Chinese must fight for their right to exist outside the Great Wall. Their one protection to-day is the presence of Japan in Manchuria. Japan's existence is equally at stake, for if China falls, Japan's independence will again be imperilled. Japan can place no faith in the present Chinese Government or any of the factional leaders. Aside from Chang Tso-lin, they all have had direct dealings with Moscow, the traditional enemy of both China and Japan. So as long as the Russians rule Mongolia; so long as they control the Chinese Eastern Railway and mass their armies along the northern Chinese borders; so long as Russian agents are stirring up revolution in Southern, Central and North-western China and caravans of arms pass freely across the Gobi Desert; so long as any agreement exists between any one Chinese faction and Moscow; so long as Russian money, arms, munitions and military experts are pouring into China to foment trouble; Japan's one guarantee of security is her possession of the South Manchuria Railway and the enjoyment of the other railway rights she has acquired in that territory. To hand over her strategic position in Manchuria by consenting to the construction of new Chinese railways that undermine her rights and powers of defense, is to court disaster. Japan does not intend to fight another war to preserve her independence to please the Chinese or to see her hard won rights once more handed over to Russia. The Chinese are now in Manchuria; a Manchurian war lord dominates the Peking Government, but Manchuria is not China. The time may arrive when Japan in self defence may be compelled to remind the Chinese of this fact.

Dr. Hornbeck in Washington

DR. STANLEY K. HORNBECK, one of the most successful of the American experts on Far Eastern Affairs, has been appointed Chief of the Far Eastern Division of the State Department. This appointment will be a source of the greatest satisfaction to Americans in China and other Far Eastern countries, because there is always an advantage in having a man at the head who is an expert, who knows conditions, who has travelled the country and who knows the people. Dr. Hornbeck is a worthy successor to Mr. McMurray and Mr. Johnson, both of whom brought a great wealth of knowledge and experience to this office.

Dr. Hornbeck first gained his experience as an instructor in Chinese Government Universities in many parts of China. It was as a teacher that he came into direct contact with the youth of China and came to know intimately many of the principal factors in current Chinese politics. His book, "Contemporary Politics in the Far East," is necessary in every reference library for its wealth of detail and accurate information with regard to these countries. He was



Dr. Stanley K. Hornbeck

subsequently a member of the Far Eastern Division of the American delegation to the Versailles Peace Conference and more recently of the American Delegation to the Tariff Conference and the Commission for the Abolition of Extraterritoriality. He was an expert attached to the Washington Conference. Dr. Hornbeck has thus been personally associated with every important diplomatic situation involving the Far East in recent years.

Efforts will be made during the next year to force the United States into a revision of treaties with China. It will require a man of knowledge, foresight and great wisdom in Far Eastern affairs to meet the onslaught judiciously, with a fair regard to the welfare of the Chinese people and with an insistent consideration for the interests of the United States. Assistant Secretary of State Johnson, Dr. Hornbeck in Washington, Mr. McMurray in Peking and Mr. Cunningham in Shanghai offer officials who will serve the United States and at the same time bring a broad, humanitarian vision in their dealings with the Chinese.

The Forgotten Third Principle of Sun Yat-sen—the Welfare of the People

Submerged Millions of China Starve and Suffer while Politicians Play their Petty Sport of Civil Wars

Famine, Rapine, Hunger, Homelessness, the Reward of the Masses

INTERVENTION HAS ITS ADVANTAGES

From the Chicago Tribune, Nov. 22, 1927

Time conquers the less progressive portions of the globe by famines, plagues, and organized murder, or else by intervention, or imperialism, or whatever you wish to call it.

In the Latin and the brown nations of the Caribbean and Central America the United States has constituted itself the agent for the latter method. In China, agreement amongst the nations permits the more natural system of evolution to run its course.

Though not uniformly successful, the guardianship of the United States has worked fairly well. At a comparatively small cost in lives and suffering it has turned disorder into order and savagery into something with a veneer of civilization. It has been fairly altruistic also. American gains have been matched by Haitian, Porto Rican, Nicaraguan, Cuban and Panamanian profits. While the protection of legitimate American interests has been the cause of intervention rather than a spiritual desire to bring sunlight into dark souls, the countries and the peoples where the United States stepped in have not been exploited for selfish American ends.

Then we read dispatches from China. Twenty thousand refugees from Shantung province are begging, famished, and half naked in the streets of Tsinan. "The colossal shadow of human disaster unequalled since the world flood settles over China," writes Charles Dailey. He tells the case of the town of Shihchiachwang, a town to compare, he says, with Bloomington, Ill. The town is a skeleton now, devastated, depopulated, ruined; the houses of the farmers, empty mud walls; and the wells fouled by the bodies of the girls who leaped in to escape the ravishing soldiery.

International jealousies, very practical economic reasons, and a high minded desire to let China work out its own destiny in keeping with its aspirations for sovereignty—and all these supported in America by pacifism and sentimentalism have kept the Powers, including the United States, from intervening in China beyond the protection of their nationals.

But intervention or imperialism—or whatever you choose to call it—has its advantages. It has its advantages if the prevention of human suffering is in itself, without regard to the more ruthless natural law, desirable."

SUN YAT-SEN based his political program upon three principles, Nationalism, Democracy and the Welfare of the people. The Chinese have concentrated only upon one principle, Nationalism. They have fought wars, they have invited the assistance of the Russian Communists, they have destroyed cities and committed outrages for the sacred cause of Nationalism. History abounds in similar experiences throughout the world. But Chinese Nationalism means little more now than the moving of armies from province to province. The Northern troops are as Nationalistic as any of the Southern armies. And there is no army, no faction, no party, no single group which can claim to have a monopoly on Nationalism. All Chinese are Nationalistic. All Chinese wish to see their country great, the equal, if not the superior, of any nation on the face of the earth. Dr. Sun Yat-sen's party, the Kuomintang, has given the impetus to the Nationalist movement in China, but the germs having been cast before the whirlwind of revolution have fallen everywhere and have sprouted everywhere. Who can say that Marshal Sun Chuan-fang is less nationalistic than General Chiang Kai-shek? Who can say that General Pei Chung-hsi at Hankow is more nationalistic than General Yang Yu-ting at Mukden?

Democracy is a far-cry. No attempt at democratic Government has ever been made in China beyond the initial few months in 1912 when Dr. Sun Yat-sen was President of the country. Democracy was suppressed by Yuan Shih-kai and the Northern militarists who set up a feudal régime of rule by military force. At no time was there Government by military force in the interests of the masses; it was rule by military force in the private interests of the ruler. The Chinese people turned to the Kuomintang, to the fervent Nationalist movement which was coming from Canton

under the leadership of the memory of Sun Yat-sen and the Youth of China, for a democratic government. Here was modernity! Here was democracy. The people yearned for the success of the Nationalist cause. They suffered every hardship to bring success to the Nationalist armies. In fact, city after city was captured, not by the army but by bands of armed civilians, who took over and held places until the Nationalist troops reached them. The great metropolis of Shanghai was occupied by armed civilians. The masses of the Chinese people hoped that the Kuomintang would bring them democracy. The people's party and the people's army would establish a people's Government.

But there has never been political democracy in China. The Kuomintang has never allowed the people a voice in the Government. They have forbidden opposition; they have suppressed the right to freedom of press; they have dubbed every effort to limit their authority as counter-revolutionary. The Nationalist Government has not been a Government of the people; it has by an autocracy established by a group of Party members, ruling over the people of South China. Dr. Sun hoped to establish a democracy in China, but his followers impeded the growth of democracy and prolonged the life of feudal militarism. Dr. Sun's Third Principle "the welfare of the people" has been utterly disregarded. Kuomintang leaders have themselves anticipated this criticism by always emphasizing that excesses are inevitable during revolutionary periods, but the unparalleled destruction of life and property, the neglect of the peasant and his interests, the failure to repair dykes and to maintain means of communication, the wanton chaos into which whole provinces have been thrown, cannot be justified by any results of the revolution. The revolution has been fruitless.

In Italy, Russia, Persia, Turkey and other countries which since the Great War have witnessed revolutions, the Government set up by revolutionary process invariably sought to establish agencies for the welfare of the people. In China no such agencies have been created. Hundreds of millions of dollars of taxation have been dissipated in the welter of civil war, in the efforts of individual militarists to establish themselves in tax-collecting positions. Not one cent has been expended for constructive purposes. This is as true in South China as it is in North China. Since the missionaries have been driven from the country, schools have been closed except a few foreign universities which are functioning on reduced rations.

Throughout the famine belt of North China, in the provinces of Shantung, Honan and Chihli, millions of human beings are without food, without shelter, without care. No government seems to assume responsibility for these famines and when in the Spring the floods, come in these areas as they almost always do, again there will be no responsibility and no efforts to save the Chinese people. The emigration of large numbers of Chinese from the provinces of North China to Manchuria and from South China to the British and Dutch colonies of the South Seas is due to the natural desire of human beings for safety and an equal opportunity of obtaining the necessities of life by labor. The Chinese in China may denounce foreign imperialism, but when opportunity offers, they take refuge from the exactions and selfishness of their own officials in the well-governed countries of the imperialists.

In the past, the welfare of the Chinese people has been the keenest interest of large numbers of Americans. American money from G.\$12,000,000 to G.\$15,000,000 a year has been expended here in educational, religious and sanitary enterprises. The Peking Union Medical Hospital and the work of the Rockefeller Foundation are outstanding features of American welfare work in China. Whenever a famine or a flood impoverished an area the American Red Cross rushed into it with food, medical attention and welfare work. The first good roads which were built in China in recent years were laid out by the American Red Cross as a famine relief endeavor. Yet, inspired by the Russians, the American missionaries and educators and the American doctors and welfare workers have been driven out of South China. Hospitals and schools have been closed or taken over by groups of Chinese. Chinese Christians have advised the missionaries that they may remain in China in a consultative capacity but that the day of active service in this country is over. The result has been that the Southern armies suffered more from cholera last summer than from the casualties of warfare. The capital of the Nationalist Government was for weeks an infected port which no one dared visit. In spite of the opposition of the Chinese, the American missionaries are seeking to return to the scene of their labors because they know that the Chinese people, the masses, the suppressed and suffering masses welcome them and love them.

The question often arises whether a great and wealthy nation like the United States does not owe it as a social duty to mankind to intervene on behalf of millions of human beings who are helpless and oppressed by their own officials. Disease knows no national boundaries. The deadly Spanish influenza epidemic of 1919 started at Harbin and spread throughout the world. The Black Death began in Asia and wiped out half of Europe. The misery and poverty of the Chinese masses, the lack of responsibility on the part of the Government, the selfishness of the officialdom, does not alone affect China but it, in time, may bring misery to the entire world. The Chinese people are hard-working, industrious and peace-loving. Because they are illiterate they are easily stirred by slogans and these slogans are designed by their rulers to divert their anger from themselves to the foreigners. The peasant seeks only to till the soil uninterfered with and uninterrupted and the bulk of China's population consists of peasants. Have we the right as brothers of men to plan the exploitation of these peasants, to regard their misery objectively, to ignore the dangers that lurk in their diseased bodies?

Dr. Hu Shih and Mr. Wu Tze-hui, undoubtedly the most brilliant men in China to-day, have been impressing their people with the lowliness of their civilization because its foundation is antiquated and its physical basis brings no comfort and freedom to the individual. Dr. Hu Shih particularly makes the point that whereas the rest of the world is in the motorcar civilization, China is still in the ricksha civilization. Most of the political troubles of China can be traced directly to the paucity of means of communication. There are few roads; there are few railroads; the efficiency of the canals are not maintained; the waterways are not improved; the vehicles of transportation are not modern; the telegram system is inadequate and telephones are barely known outside of the large cities. No Government can unify China because it cannot speedily communicate with the whole of China; no Government can control the whole of China because it cannot move peace-maintenance troops from one part of the country to another; no Minister of Finance can institute an efficient system of taxation because he is unable to reach recalcitrant and corrupt officials with sufficient rapidity to avoid embezzlement and misappropriation of funds.

The people cannot become literate because man is the only machine that works. The substitution of labor-saving devices for man-power is a vague dream in a country which is only a month's distance from the highly mechanistic civilization of the United States. There cannot be a protection of the child because the economic demands of the parent are such that they must enslave their own child, who competes with the water buffalo and the ass in the production of agricultural produce. There cannot be an elevation of thought where there is no leisure and when there is no opportunity for reading and thinking and discussing. The world has been accustomed to judge China by the few merchants and students who travel abroad and whose



President Coolidge on China

Annual Address to Congress

"We have been compelled to send naval and marine forces to China to protect the lives and property of our citizens. Fortunately their simple presence there has been sufficient to prevent any material loss of life. But there has been considerable loss of property. That unhappy country is torn by factions and revolutions which bid fair to last for an indefinite period. Meanwhile we are protecting our citizens and stand ready to co-operate with any government which may emerge in promoting the welfare of the people of China. They have always had our friendship, and they should especially merit our consideration in these days of their distraction and distress."

eloquence astonishes Western ears, but the masses of the Chinese people are ground under the heel of militarism and ruthless taxation.

Men of the West dread the thought of sending well-trained, well-equipped, military forces to China to fight against the coolies of this country, but our intervention need not be a military intervention. Our intervention might take on the form of a humanitarian service to the Chinese people. The United States has brought prosperity and health to Cuba and other Central American countries. The United States has taken the island of the Philippines and has brought to them the advantages of Western civilization, but we have resisted any attempt on the part of any nation to bring to the Chinese people the benefits of Western civilization. In the Japanese controlled area of Manchuria there is peace and prosperity. In the foreign settlements and concessions there is peace and prosperity. These foreign-controlled areas in China have been beacons for the Chinese people and from them have gone forth the *intelligentsia*, not to teach and help their own countrymen, but

to impress foreigners with their own greatness and importance.

The time has come for the West to consider China as a country which required the care of the physician and the engineer rather than the politician. China is sick, the diagnosis indicates a dilapidated physical basis, the remedy can only be railroads and roads and sanitation, and after them, education.

Can America ignore her sick neighbor of the East? If there are those who love China more than they do their European allies, if there are those who have fought against foreign intervention in China and have found an excuse for every breach of international etiquette, for every outrage in China during the past year, let them show the sincerity of their views. They have supported groups and cliques and parties and Governments, but they have given not a thought to the Chinese people and to their future. Military intervention is unfeasible and perhaps unnecessary, but the intervention of the engineer and the physician, the road builder and the railroad builder, the mechanic and the sanitary expert, are crying needs of the Chinese masses.

Daylight in the Philippines

Horse Sense at Last

THE Message of President Coolidge to Congress and the annual report of the Secretary of War tell us in no unmistakable terms that the present Administration is determined to carry forward the good work of Leonard Wood in the Philippines along lines that will bring greater economic stability to the islands. The President's Message says:

"Conditions in the Philippine Islands have been steadily improved. Contentment and good order prevail. Roads, irrigation works, harbor improvements and public buildings are being constructed. Public education and sanitation have been advanced. The Government is in a sound financial condition. These immediate results were especially due to the administration of Governor-General Leonard Wood. The six years of his Governorship marked a distinct improvement in the islands and rank as one of the outstanding accomplishments of this distinguished man. His death is a loss to the nation and the islands."

"Greater progress could be made, more efficiency could be put into administration, if the Congress would undertake to expend, through its appropriating power, all or a part of the customs revenues which are now turned over to the Philippine Treasury. The powers of Auditor of the islands also need revision and clarification. The Government of the islands is about 98 per cent. in the hands of the Filipinos. An extension of the policy of self-government will be hastened by the demonstration on their part of their desire and their ability to carry out cordially and efficiently the provisions of the organic law enacted by the Congress for the government of the islands. It would be well for a committee of the Congress to visit the islands every two years."

This is clearly a hint to the Filipinos that if they do not enact the legislation that will create a proper economic foundation for the islands, Congress will do it for them. It is also a declaration that the dependence of the Governor General upon a native oligarchy for the funds to maintain a personal staff of expert advisers and assistants is to be done away with and the moneys now turned into the Philippine Treasury from customs collections in this country are to be placed at the disposal of the Governor General for such uses as he deems best.

For many years THE FAR EASTERN REVIEW has condemned the policy of holding out the promise of ultimate independence to the Filipinos and then making impossible the carrying out of our pledges by enacting laws which operate against the laying of a proper economic foundation upon which an enduring political

edifice can be erected. In devoting all our activities to the political, cultural and moral uplift of the Filipinos and doing nothing to create an industrial system which would absorb their energies, we have developed a generation of office-seekers and office-holders. We have made the same mistake in China, expending millions for uplift and education but not one cent for the creation of industries that would add to the material welfare and comfort of the Chinese. As in the Philippines, so in China, the recipients of our philanthropies have taken to politics as a duck does to water, and quoting our own slogans of Democracy, Equality and Liberty, are now demanding from us a complete freedom in the management of their own affairs. Altruism is giving way to horse-sense. For the first time in the history of our relations with the Philippines, a Secretary of War acknowledges that our benevolent program has failed. Secretary Davis says:

"There can be no doubt in the light of events—and there appears to have been no doubt in advance of the event—that the effort to develop in the Philippines a people capable of self-government has, to an extent, interfered with the economic development of the islands. Necessarily there has been a stressing of the political capacity of the people, at the expense of the development of productive capacity."

This might have been taken bodily from some of the many editorials in this magazine on the Philippine problem. The Secretary goes further and condemns the land laws, but diplomatically refrains from emphasizing the fact that the original restriction on the ownership and leasing of public lands in the Islands was enforced by a Congress subservient to the domestic beet and cane sugar interests. In the Organic Law of 1902, Congress imposed the restriction on the ownership or leasing of public lands in the Philippines to 1,000 hectares, ostensibly to protect the Filipinos from exploitation, in reality, to protect the home beet sugar industry against the competition of cheap tropical sugar. The Philippine Commission repeatedly protested against this law as detrimental to the economic development of the Islands, but Congress did nothing until 1916, when, through the provisions of the Jones Law, it passed the buck to the Philippine Legislature. But the time was inappropriate for any concessions. With visions of an early independence and a continuance of war prosperity, the Filipino leaders were unwilling to enact legislation opening up the public domain to large scale development, fearing an influx of American capital that would oppose complete independence. The remedy for the land laws has been in the hands of the Filipinos themselves but they have refused to apply it. American capital that would have taken up huge tracts for the cultivation of rubber has been driven away and

that economic foundation on which their independence must be erected, made that more difficult to attain. Secretary Davis states the situation very clearly and succinctly when he says:

"The present land laws limiting the holdings of persons and corporations are a serious handicap to rapid progress. The laws originally were passed to prevent harmful exploitation of the natives. But obviously when we study the development of other tropical countries, these provisions must be regarded as a serious hindrance to the rapid progress of the Islands."

"The protective purpose underlying the laws could be better realized, in some other manner. The restrictive land legislation has provided the beneficial use of idle public lands, according to report, deprived the central and local governments of much needed revenue, and left large sections of the islands as breeding places for pestilence."

The Secretary of War goes further and points out that the development of the Islands under a modification of the land laws goes hand in hand with some modification of the labor situation. By the same Organic Act of 1902, Congress extended the Chinese Exclusion Act to the Philippines. Here again, was an act ostensibly designed to protect the people of the Philippines against outside competition, in reality, to prevent the Chinese from entering the United States through the back-door of a colonial possession. As a natural consequence, the Secretary adds: "this exclusion of the Chinese meant a slowing down of progress by excluding from the Islands the labor available for any rapid development. The demand for more liberal immigration laws has not been more urgent due to slow agricultural development, although the Islands could support three or four times the present population if developed." Summarizing, the Secretary says:—

"Progress in the Philippine Islands has been made under a Congressional mandate which restrained development by withholding public lands from beneficial use, limited available labor to the native supply, and, as a consequence, restrained the introduction of foreign capital."

"The foregoing statement might be used as an excuse for unsatisfactory development. It is found,

however, that the development has not been unnaturally slow and that it compares favorably with most countries of the earth. It has been peculiarly advantageous in its character to the native population, and, to this extent, has accomplished the avowed purposes of Congress."

"It is found also that development has been stimulated by certain very direct financial and trade advantages which have been extended to the islands. It is believed, however, that there could be material relaxation on those restraints which were imposed to prevent the undesirable exploitation of the native peoples. It is thought that this was the intent of Congress when it gave to the local legislature authority, subject to the approval of the President, to enact its own public land and immigration laws. It is believed that the time has now arrived when the Philippine Legislature should legislate in these respects, keeping in mind the principle that the welfare of the people of the islands must be protected and also that increased revenues of the islands are essential to the furthering of the sanitary and educational systems."

It has taken two decades to get these truths before the American people. As the *Washington Post* puts it: "our people are gradually escaping from the illusions of political evangelization in the islands and are awakening to the primary need of economic betterment there." The Filipino *politicos* demand immediate independence, but until the Islands are developed to the point where adequate revenues are available to run the government without concessions from the United States, they cannot hope to stand alone and pay their way. The Filipinos have had it in their own power for eleven years to modify the land and labor laws, but have refused to grant any concessions, fearing that American capital would take advantage of the situation and oppose ultimate independence. Well, there is other capital that would like to develop the Islands and the only way that the proper economic foundation for independent government can be obtained is to open the door and let it get to work. If the door is not opened by the Filipinos themselves under the powers granted to them under the Jones Law, Congress may be called upon to do it for them.

G. B. R.

America's Duty Towards China

Economic Intervention Alternative to Red Supremacy

Address by Geo. Bronson Rea, before the Shanghai Tiffin Club, New York.

IT is a great pleasure to see so many old Shanghai faces gathered together here in New York. Trying to tell an audience like this something about China, is like the old Yale joke; "You can always tell a Harvard man; but you can't tell him much." However, perhaps I can tell even a gathering of Old China Hands a few things that may interest them and as many of you are still engaged in business with that country, I will say a few words about the activities of the American Chamber of Commerce of Shanghai. I assume that you have all read the article in the *New York Times* of October 25 from its Shanghai correspondent in which the Nanking Government bitterly denounced the activities of the American Chamber of Commerce of Shanghai and, incidentally the "notorious tool of the Shanghai diehards" in this country. Evidently, I am the notorious tool referred to, accused of circulating literature in the United States containing unwarranted attacks upon the Nanking Government and carrying on a campaign to get the American Government embroiled in an imperialistic conspiracy for united armed military intervention in China.

This campaign of villification and misrepresentation of the American Chamber of Commerce goes back to the early months of this year when the Sovietized Kuomintang forces captured Nanking and committed the outrages which shocked the civilized world and brought every foreigner together to defend Shanghai against a repetition of these horrors. Some of you may have been in Shanghai at that time and know more about it than I do. I was not there.

My information is second-hand. But the evidence is all in and we now know just what happened.

Americans in Shanghai were confronted with a situation where their lives, their properties, their homes and the honor of their women were at stake. Their uppermost thought was to obtain from their government adequate armed protection in loyal co-operation with the forces of the other Powers. The danger was real. It was imminent. Tremendous pressure was being brought to bear upon the President and Secretary of State to withdraw our warships and troops, evacuate all Americans, surrender immediately to the demands of the Kuomintang and desert the other Powers whose troops were already on the ground policing and defending the Settlement. One American, prominent in our community in Shanghai and, who at one time aspired to a high official position, even went so far as to tell his audience in Los Angeles that every American who remained in China deserved to be shot. Now the first duty of the American Government was to protect its citizens. The question of China's sovereign rights did not enter into the picture.

Those of us who have lived in China labor under no delusions as to the real issue at stake in the present phase of China's civil war. It has been clear for several years that the driving force behind Canton came from Moscow; that a Nationalist victory meant a triumph for the Soviet; that sooner or later foreign property would be confiscated and nationalized; foreign loans repudiated and all foreigners driven from the country. The surrender of

Shanghai to the Nationalists would have converted the port overnight into the Far Eastern center of World Revolution, a menace to every other nation bordering the Pacific.

It was not until this danger was brought home to Americans in Shanghai that our Chamber of Commerce placed itself squarely on record as favoring armed intervention for the protection of foreign lives and properties. It went further and urged concerted action by the Powers to restore a condition of security in all the treaty ports and, to recover all foreign properties that had been destroyed or confiscated. This resolution was the natural reaction to a long drawn out reign of terror, legitimate and reasonable under the circumstances. The issue involved was not one connected with Chinese sovereignty or interference in their internal affairs, as some Americans would like us to believe. The Nationalists were entitled to a square deal, but they surrendered their right to appeal to the world on this basis, when they let in the Soviet and accepted its arms, munitions, money, advisers and military experts. The Nationalists cause had become prostituted and diverted from its legitimate aims into a warfare against the so-called capitalist Powers. The Nationalists armies were the screen behind which Russia hoped to drive the British, the Japanese and Americans from China. When the evidence establishing these facts is overwhelming, the menaced Powers have an equal right to protect themselves by forcibly intervening in China's internal affairs. We cannot apply one principle to one nation and deny the extension of that principle to others whose interests are placed in jeopardy. When Chinese mobs and uncontrolled soldiery run amock, killing, looting and outraging foreign women, the first duty of every red-blooded American was to stand shoulder to shoulder with his own kind for mutual protection. We are told that the Chinese are entitled to a square deal. So they are. Americans in China are also entitled to a square deal.

This was the sentiment which guided the American Chamber of Commerce of Shanghai in appealing to its government for armed protection in co-operation with the forces of the other Powers. That its stand was well taken has since been fully vindicated by events. The united opposition of all foreigners against the further spread of the Soviet menace was the only thing that called a halt to the communizing of China. This open and frank appeal for armed intervention on the part of the American commercial community and the joint note of the Powers calling upon Nanking for an indemnity, decided the Nationalist leaders that they must shake off the Soviet and stand before the world on the merits of their own movement.

For the past six months the Nanking Government has been putting up a desperate fight to rid the Kuomintang party of Soviet influence. To consolidate its position it is now carrying on a campaign to oust the reds from Hankow. Feng Yu-hsiang, who has been on every side of every fence in China the past fifteen years, is still receiving arms, munitions and finances from Moscow. His wife and children reside in the Soviet capital. Mrs. Sun Yat-sen and Eugene Chen are in Moscow. They will return to China with Soviet backing to start another revolution to restore Red influence. Two communist armies are ravaging South China. The port of Swatow is in their power. Wang Ching-wei, T. V. Soong and other leaders have returned to Canton with the avowed purpose of organizing another simon-pure Kuomintang government. Yen Hsi-shan, the overlord of Shansi, is reported to have fallen under Soviet influence, which explains his recent attempt to capture Peking. Half of Mongolia is included in the league of Soviet Republics. Chinese Turkestan is under the domination of Moscow. The Chinese Eastern Railway zone and practically all of North Manchuria is a Soviet sphere of influence. Everywhere you turn in China you find the evidences of Moscow's intervention. We are told that communism is uprooted in China. Yet the facts remain as stated. The communists are still there. Communists agitators driven out by Nanking and Peking have taken refuge along the Mongolian borderlands under the rule of Feng Yu-hsiang, ready to return at the first opportunity. With this picture before us, are we justified in relaxing our vigilance? Can we safely withdraw all our war-ships and troops and invite a repetition of what occurred last spring? Let me say this. If any other nation had interfered in China to the extent that Russia has done, public opinion in this country would long ago have clamored for war. What we meekly accept where Russia is concerned would not be tolerated from other nations. Americans in China were red hot to fight Japan in 1920, for much less than Russia has done to impair her sovereignty. Yet if Great Britain or Japan should adopt measures in China to

protect their huge investments that we ourselves do not hesitate to apply nearer at home, a howl of indignation would go from one end of this country to the other.

Remember that if Great Britain or Japan are open to criticism for their activities in China, Americans are equally vulnerable in Latin America. So-called American imperialism is now under fire in those countries for the identical reasons the British are condemned for in China. In the Caribbean and Central American countries, Soviet and European propaganda has been successful in stirring up the people against us, even though in every case, the investment of American capital is all that has brought a small measure of prosperity to the natives and furnished the Governments with the bulk of their revenues.

We are learning that sentiment and business does always go hand in hand. When a few more of our foreign loans are repudiated or defaulted, we will become as hard boiled as other nations whose methods we have so bitterly assailed. When we find that our loans to Europe are being used to deprive us more and more of our export markets, and the struggle to preserve our trade position becomes intensified through foreign competition and the urge of our rapidly expanding mechanical civilization demands wider markets to keep our factories operating at a profit, then, and only then, will we awake to a realization of the part our foreign investments must play in the national economy. When we reach that point we will begin to understand that much of this talk about imperialism and political aggression cloaked under the terms of foreign loans, concessions and contracts, is largely bunk. The real aim is to create business. It will require all the statesmanship and eloquence of President Coolidge and the members of the American delegation to the next Pan-American conference to be held in Havana this coming January, to dispel suspicions of our motives. In other words, we are up against the same situation here as the British and Japanese are in China. I emphasize this situation, for the reason that I see in it only the natural reaction to our superior attitude towards other Powers in China. Other nations are retaliating, hurting us where it hurts the most. The same principle which justifies the use of force in protecting American lives and properties in Latin America, applies equally to the protection of foreign lives and properties in China, and, to the same extent. There may be excellent reasons why our Government refuses to commit itself in China beyond what it is already doing, but whatever they are, Americans are not justified in condemning Powers who apply in China, the same methods we do not hesitate to enforce nearer at home. China is entitled to American sympathy, but the other Powers having large investments in that country have an equal claim to our consideration.

Do not misunderstand me. I am not here to influence public opinion or our government to join in any so-called imperialistic conspiracy for military intervention in China. I simply invite attention to facts which in my mind fully justify the much criticized resolution of the American Chamber of Commerce.

The Chinese have the right to run their own country in their own way without outside interference. There can be no objection from other nations if they accept the Soviet theory of government as long as they discharge their obligations under existing treaties. The day will come when these treaties must be revised but we cannot surrender our present status until such time as China is unified under some stable government representative of the whole country, a government that can hold out some guarantee of law, order, justice and security. That is the attitude of the American Chamber of Commerce of Shanghai. I have reasons to believe that it is also the attitude of the American Government.

We cannot be rushed into treaty revision with any one faction. We cannot recognize all the various factions, as suggested by Senator Bingham, without paving the way for the division of China into several independent states. On the other hand, if any one or several of these factions, as is now the case, continue to accept arms, munitions and money from Moscow for the avowed purpose of enforcing their rule over the whole country, we must expect sooner or later that other nations whose vital interests are imperilled, will welcome the opportunity to recognize and support any faction that will stand up and fight against the spread of communism. If we can save China from coming under the complete influence of Moscow, it makes little difference what means we employ to justify the end. From one point of view, Senator Bingham's ideas have much to commend them, for, if we recognize all the factions, other Powers must follow suit. Once the policy

of international solidarity in dealing with China is abandoned, the way is open for other Powers to enter into treaty relations with factions they can openly support with arms and munitions in order to fight the Soviet with their own weapons. This means the partition of China into at least two permanent states, one allied with the Soviet and the other supported by Great Britain and Japan. Under existing circumstances, it is safe to say that the American government could interpose no objection if other Powers openly financed Chang Tso-lin in his fight against the Sovietizing of China. How much less could we object, if a situation was created where the way is open for complete recognition of all the factions, with the certainty that such support would take a more legitimate form.

We may be forced to accept Senator Bingham's plan in the end, but I hold to the belief that there is a possible solution along another line. I believe that ultimate intervention is necessary, but instead of sending armed forces to complicate the situation, intervention should be carried out along benevolent and friendly lines. To my mind, the Chinese problem is an economic one, a desperate struggle on the part of the masses to eke out a mere existence. Outside of Manchuria and to some extent in the principal treaty ports, progress and development has been arrested for fifteen years due to lack of capital to create industries and public works that would absorb the energies of the masses. There are good reasons perhaps why foreign capital has refrained from going into China since the beginning of the world war, but the fault has not been entirely on the side of the Chinese. Since the war, private American capital to the amazing total of \$13,000,000,000 has been invested in foreign countries, but not one cent has gone into China. I wonder whether Americans realize that whatever prosperity China now enjoys is due entirely to the investments of foreign countries which have created the railways, and established the industries which in turn have created the trade we now so largely participate in. America has contributed cheerfully to the education and moral uplift of the Chinese but has left to other nations to provide the economic foundation on which Chinese prosperity and American trade must be erected. Our nominal stake in China is placed at \$160,000,000 of which \$80,000,000 represents missionary and educational investments. That however is not our real stake. To arrive at any fair estimate, we have to go back twenty years and take all our missionary and educational expenditures, remission of the Boxer Indemnity, Flood and Famine Relief, Rockefeller Institute expenses, repudiated debts and unpaid bills for materials supplied to the Chinese Government, losses on exchange due to an unstable currency and the general deficit that shows up annually in the red ink column of the American business men's ledgers arising from disturbed conditions; in order to gather even an approximate idea of America's stake in China. It is not very far from the truth to state that the total will exceed \$600,000,000. Neither is far from the truth to say that the total profits on our exports to China during that period, will not exceed \$100,000,000. We neither ask for, nor do we expect any dividends on this investment, but the investment is there nevertheless, a half a billion withdrawn from the national economy for the uplift of a foreign nation, an investment in good-will, that will take two decades of peaceful and profitable trading to make up. Suppose we had placed even one-fifth of this amount in productive enterprises that would have provided an outlet for the energies of the Chinese, and, let us even suppose, that we had received no direct returns on this investment; would we be any the worse off than we are to-day?

Why then, should we not carry our benevolence a step further along practical lines and endeavor with the use of our unlimited wealth to bring about peace in China through compromise? No lasting peace can be established in China until some means are found to provide immediate employment for hundreds of thousands of men who now rely upon the possession of a rifle for their existence. These armies can never be disbanded until immediate employment is provided for the disarmed soldier. No war-lord would dare to turn loose a hundred thousand or more men on the country unless he could put a pick and shovel in their hands and put them to work. The Chinese soldier is not a fighting man at heart. The majority have been impressed into military service and would welcome the opportunity to return to peaceful labor.

As long as the Soviet is supplying arms and munitions to Feng or to other leaders, and the Powers sit quietly by and do nothing to counteract this influence, sooner or later, the Reds will rule China. If we cannot intervene with arms, we might intervene with money. We might say to the various Chinese leaders

that if they come together, settle their differences and establish a government representative of the whole country, we will take a chance and advance the funds that will permit the immediate construction of railways, roads and other essential public works. Give the Chinese the assurance that our capital will start work on a thousand miles of Chinese government railways and a network of trunk highways, and that as long as peace and security prevails, that this program will be carried out until ten thousand miles of new lines with highway feeders are operating; and watch the result. There are political and financial difficulties in the way, but some proposition along these lines would command the immediate and respectful attention of every thoughtful Chinese. We have taken a chance in Europe. Many of our foreign loans will never be repaid, yet this year, we have floated \$1,500,000,000 in new issues. If \$70,000,000 was guaranteed to put China on her feet, to be followed with an equal amount annually over a period of five years, the Chinese would soon find a way to settle their differences and come together to reconstruct their country.

I believe that some such plan acceptable to both sides could be worked out. We must devise a new American policy toward China that will take the place of the Open Door doctrine that goes into the discard when China's full sovereignty is recognized in new treaties. We can do that by a benevolent intervention that will bring the Chinese factional leaders together in a round-table conference that will pave the way towards peace. We can take our choice, sit still and permit the Soviet to establish itself firmly in China, drive out our traders, close that great market to our manufactured products and delay for another generation the development of its resources, or, we can make an effort to bring about a compromise that will result in peace and prosperity. No other nation had the resources or the capital to initiate such a program. Our diplomacy has created a situation which morally obligates us to make the effort. Let me tell you why we should take the initiative. Last year I was in Geneva during the first general assembly of the League of Nations and talked with many of the delegates about China. From there I went to London and called on the head of one of the most important British firms doing business in China. He told me that he and others of the China committee, were unanimous in that the only solution to the Chinese problem was for the League of Nations to offer its friendly services to the Chinese factions in order to restore peace and reorganize the finances of the country along the lines so successfully carried out by the League in the financial rehabilitation of Austria and Hungary. China is a member of the League and would probably accept its friendly intervention where it would never listen to advice from any of the interested Powers. I was deeply interested in the idea. So much so, that I made another visit to Geneva shortly afterwards to discuss it with the Chinese delegate and members of the League council. One of the highest officials of the League was very frank. He said "the League would gladly and willingly consider any proposal that might lead to the restoration of peace in China and place the country on its financial feet." But, he added, "you must remember that the United States is not a member of the League and any plan for the financial rehabilitation of China in order to succeed, must have the approval and co-operation of the American Government. American capital would have to carry perhaps the major participation in any such a plan. Here we meet with an almost insurmountable obstacle. American policy towards China is embraced in the consortium agreement. The consortium as it stands to-day is purely an American instrument, created at the express invitation of the American Government. The American Government is therefore committed to support the consortium. The League of Nations, while intensely interested in China's troubles and willing to do anything to help a member nation to adjust its difficulties, cannot take the initiative and hazard the risk of being snubbed by a non-member state whose co-operation is essential to success." In other words, the League of Nations will not invite a loss of prestige by exposing itself to a refusal on the part of the American Government to co-operate with it. The American Government cannot invite a loss of prestige by subordinating the instrument of its own creation for financing China to the League of Nations. The situation is clear. Whatever is done from the outside to restore peace to China through some economic program must be initiated by the United States. We cannot sit idly by and take the line of least resistance while China goes Red. It is up to us to do something. This, in brief, is the intervention that the "notorious tool of the Shanghai die-hards" is seeking to bring about.

America's Obligation to the Filipinos

Repeal the Land and Labor Laws in Order to Create the Economic Basis on which alone Independence can be Maintained

By George Bronson Rea

THE everlasting sugar war is on again. Cuba is asking for a new reciprocity treaty with the United States with a revision of the tariff that will favor American manufactured products imported into Cuba and at the same time lower the preferential duty on Cuban sugars entering this country. The beet sugar men are up in arms ready to oppose any further reduction in the tariff in favor of Cuba. The fact that a new reciprocity treaty would enable our manufacturers to regain and hold their supremacy in the Cuban market and that American capital invested in the Cuban sugar industry is nearly seven times greater than the total invested in the home beet industry, means nothing to the beet sugar industrialist. Incidental to this continuous fight on the part of the beet sugar interests to protect their investments, is the question of the past, present and future status and prosperity of the Philippines.

America's failure properly to develop the Islands and create an economic foundation for future independence, is traceable directly to the opposition of the beet sugar lobbyists, who, as early as 1902, brought pressure to bear upon Congress to pass the Philippine Land Law, restricting the ownership of lands to 2,500 acres, in order to prevent American capital from owning or leasing large tracts of the public domain suitable for the profitable and economical operation of a modern cane sugar industry. The law accomplished its purpose, but in protecting the infant beet sugar industry from Philippine competition, the nation has heavily penalized itself in other directions. The Philippine Land Law applies equally to all enterprises. It is impossible for a corporation or an individual to own or lease more than 2,500 acres of land for the cultivation of rubber or other highly profitable tropical products.

Had this Land Law not been our statute books in 1907 (the year of the great rubber boom) millions of dollars would have been invested in the Islands for the development of rubber plantations. While the entire Far East was withdrawing its savings from the banks, selling its securities and converting property into cash in order to purchase shares in the new Malayan rubber companies, several promoters from Manila tried to interest China Coast investors in new Philippine ventures, but were turned down because of the land restrictions and labor laws. Millions of Far Eastern capital were invested in Malaya where such restrictions did not exist. Within six years, the new plantations were producing and when the Great War started in 1914, Great Britain practically controlled the world's supply of rubber. The rubber Empire of Malaya is now one of Britain's most valuable assets, a source of continuous and untold revenue, to defend which, she is now constructing a formidable naval base at Singapore.

Every dollar in excess of the legitimate or fair price of rubber that the United States has paid out since the Stevenson Act went into operation, can be charged against the Philippine Land Law and the home industry it was designed to protect. A comparison of the relative importance of beet sugar and rubber in our national economy is sufficient to indicate the shortsightedness of a tariff policy which favors a minor industry to the detriment of a major one. In 1925, there were 89 beet sugar plants in operation with an average of 8,872 workers employed, earning \$12,000,000. The cost of the raw material was \$87,000,000 and the value of the finished product, \$132,000,000 or a contribution of \$45,000,000 to the national prosperity. During the same year, there were 498 rubber factories in the country, employing an average of 141,121 workers who received in wages, \$190,000,000. The cost of the raw materials was \$718,000,000 and the value of the finished products, \$1,225,000,000, or an addition of \$536,000,000 to the nation's wealth.

The operation of the Stevenson Act cost the American rubber manufacturers about \$300,000,000 in a little more than a year, and although there is now a tendency towards maintaining a proper

price level, restrictions can again be imposed that would once more send prices soaring skyward. In order to escape from the operation of this monopoly, American rubber interests have invested over \$15,000,000 in Sumatra and Malaya; the Firestone Rubber Company, after fully investigating the possibilities in the Philippines, has gone to Liberia where the development of its million acre concession calls for the expenditure of at least \$100,000,000 to bring under cultivation only a part of the properties. Henry Ford has obtained a large concession in Brazil, and if his plans are carried out, it will mean the investment of another \$100,000,000 of American capital in a foreign country. In other words, we have here a penalty of about \$500,000,000 imposed upon the nation by the operation of a law designed to protect a minor industry whose entire capitalization is approximately \$200,000,000, and whose yearly contribution to the national wealth may average \$30,000,000 a year for the past ten years. Eighteen months of the Stevenson Act and its effect upon the American rubber and automobile industry, has sent more money out of the country than the beet sugar industry has made in ten years.

These figures speak for themselves. After nearly thirty years of existence, the domestic beet sugar industry is able to produce less than one-fifth of the national consumption of sugar. Not only can it never hope to supply the requirements of the nation, but its advocates admit that they can never find the capital to build factories fast enough to keep up with the normal increase of consumption. In other words, the beet sugar industry has about reached its limit in supplying its quota of consumption. To maintain even this inferior position, it must continue to be highly protected, while American investments in Cuba, totalling \$1,350,000,000, (six times the amount involved in beet sugar manufacture) are jeopardized, and our program in the Philippines defeated. For, we can never carry out our pledges to the Filipino people until the Islands are placed on a sound economic basis and this can never be done as long as the Land Law enacted to protect the beet sugar industry, remains on our statute books.

Sooner or later, we must adopt a definite program for the Philippines. A moral obligation exists for the American Government to recognize the independence of the Philippines when that independence can be maintained, but the Filipinos will never reach that desired point as long as the Congress of the United States impedes the economic development of the country by the enforcement of laws which drives capital away. To hold out solemnly the promise of independence to a people and then enact and enforce laws which makes it impossible to carry out our pledges, is dishonest. After thirty years of American occupation, the total value of American investments in the Philippines is about \$200,000,000 including loans, as against \$750,000,000 distributed between Great Britain, Germany, Japan and China. Capital has gone into the Philippine sugar industry to the extent of \$160,000,000 but even with a duty-free market in the United States for all of its output, the industry finds it difficult to operate on a profitable basis because of the labor situation. The Malay in Java does six times the amount of work that his racial brother in the Philippines gives to his employer for twice the wages. Economically, he is twelve times the superior of the Filipino. The development of the Philippine sugar industry to where it now exports over 500,000 tons of sugar annually to the United States, has been made in spite of the land ownership restrictions, but all other tropical agricultural enterprises have been strangled by this one-sided legislation.

On three islands alone, there are more than 1,500,000 acres suitably located for rubber planting and this could easily be doubled or trebled as the country is opened up with roads and railroads. At a fair yield of only 500 pounds per acre, these lands could more than supply all the rubber requirements of the United States. The crushing weight of the land laws, coupled with an unwise and un-

natural extension of our Asiatic exclusion laws to an Asiatic country, prevents any large scale development of rubber or any other tropical agricultural enterprise. After 25 years of American occupation, only 2,890 acres are planted to rubber in the Philippines, of which approximately 600 acres are being tapped. The law did not stop the development of the industry it was designed to impede, but it effectively killed every other tropical agricultural activity. The law has, therefore, failed of its object. Once the land law is repealed and the Islands thrown open to the free entrance of other Asiatics, it is a certainty that within the next decade a million acres of rubber and other tropical produce plantations will be cleared and brought under production and an economic foundation firmly established upon which the Filipinos can maintain their independence. It has been estimated that the Chinese have invested over \$75,000,000 in the Philippine rice industry alone (exclusive of its cultivation). They control its milling, its warehousing and its distribution. They control absolutely the internal commerce of the Islands and to an increasing degree are extending this control over the export trade. To a large extent, Chinese capital and labor has developed the Malayan rubber industry and if extended the right of equal opportunity in the Philippines, will develop the Islands and usher in an era of prosperity that will make possible the maintenance of independence on a sound economic foundation.

Our Asiatic Exclusion Laws can no more keep the Chinese out of the Philippines than they now keep them out of the United States. They come into this country by the thousands despite all our vigilance. It is ten times easier for the Chinese to land on the coasts of any of the thousand or more islands of the Philippine archipelago than to bootleg them into this country from Cuba, Mexico or Canada. The records of our Immigration Bureau prove that the Chinese are by far the worst offenders against our laws. There is one point about this American labor law as applied to the Philippines that we should always bear in mind. If, and when, the United States fulfills its promises and concedes independence to the Philippines, the new republic will have to start out

on its independent career with the most friendly relations with its immediate and powerful neighbors. It goes without saying that neither Japan or China would recognize a minor and weak Asiatic state which excludes their citizens from entrance. A strong, united China may emerge any day from out of the present chaos. Sooner or later, we must revise the old treaties and recognize China's full sovereignty. A united China will demand equality of treatment for its citizens and although she may not for the present, insist on this point in the United States, it may be accepted as a certainty that she will demand the right of free entrance into a neighboring country, whose trade is already controlled by her citizens. Whether we wait until the Islands are ready for independence, or until a united China comes into her own and demands equality of treatment, our exclusion laws as applied to the Philippines will have to go. It will be a question of whether our trade with the Philippines or our trade with China is the most profitable, and the Chinese have their own ways of bringing pressure to bear to compel us to see their point. If they can do this in China, they can do it just as easy in the Philippines. So, if we are honest with ourselves and with the Filipino people and we intend some day to comply with our moral obligation to concede them their independence, and if this independence is to be maintained, a firm economical foundation must be laid long in advance. If for any reason, American capital refuses to provide this foundation, then in all fairness to our wards we should so shape our legislation as to permit other to do it.

From the viewpoint of the beet sugar interests any further advancement of the Philippine sugar industry is at their expense. In fairness to them and the Louisiana, Hawaiian and Cuban cane sugar interests, there must be a limit to the amount of duty-free Philippine sugar entering this market and that limit should be determined and enforced in order that a repeal of the existing land and labor laws can be brought about in order to develop those other agricultural resources of the Islands upon which the future economic stability of a Filipino Republic must rest.

Does Fear of War Operate Against Philippine Development?

COMMENTING on the possible development of the Philippines as the major source of sugar supply for the United States, the well-informed *Washington Post* says:

"In the event of independence, dominance of the American sugar trade by the Islands would be a serious matter. Occasion would arise for the restoration of the duty upon Philippine products and consequent increase in the price here. In the event of war, this country would be separated by thousands of miles from the source of its sugar supply, even if the fields themselves did not fall into hostile hands. A foreign war, with the United States a neutral, would result in the seizure of shipments intended for the United States. It would be too late to restore the productivity of Cuba, Hawaii and the West in order to provide a prime necessity."

The same argument pertains to rubber or any other tropical product that could be grown profitably in the Philippines and there is now no doubt that this bogey of a future war in which the United States may become involved is occupying the minds of many of our foremost intellects. In carrying out his experiments to find a suitable substitute for rubber, one that can be grown within the country, even at a higher cost, Edison, the great inventor, is very frank in explaining that his determination to find this substitute arises solely from the certainty that the country will sooner or later be plunged into hostilities with a combination of other powers.

Frank Parker Stockbridge in an article in the December

number of *Popular Science*, describing Edison's experiments, says that Edison told him; "Henry Ford, Harvey Firestone and I were considering what this country would do in the case of war that would cut off our rubber supply. Don't make any mistake about that war; it will come. We may run along for a good many years without it, but sooner or later the nations of Europe will combine against the United States. The first thing they will do will be to cut off our rubber supply."

Firestone and Ford have given careful study to the possibilities of rubber in the Philippines and are putting their millions into countries which promise a better chance of protecting our trade routes than the long haul across the Pacific.

If the fear of war is holding back the development of the Philippines with American capital, then why not make it possible for the capital of other nations to undertake a risk we ourselves do not wish to incur? There must have been powerful reasons other than economic, which influenced men like Firestone and Ford to invest their millions in Liberia and Brazil rather than under the American flag. Edison's explanation gives us that reason. This means, then, that even with the land laws repealed, American capital will never properly develop the Philippine rubber industry. If this is the way the wind blows, then the sooner Congress modifies the laws so as to permit other nations to undertake the job we reject, the sooner we will be able to discharge our moral obligation to the Filipino people.

The Other Side of the Picture

British Columbia Welcomes Chinese Capital

IN contrast to the American policy in the Philippines is the story that comes from Vancouver concerning the activities of General Frank Sutton, well-known in China as the military adviser to Chang Tso-lin, who superintended the erection of his arsenals at Mukden. Not long ago General Sutton signalized his appearance in Vancouver by announcing the purchase of several hundred acres of placer leases in the Cariboo region of British Columbia. Subsequently, he bought a large ranch adjacent to the placer ground and put regular forces to work on both properties. Before he became attached to Marshal Chang, General Sutton was engaged in operating a gold dredge on the Amur River and is considered one of the foremost authorities on the placer workings of that region, so it is not strange that he plunged into his favorite business as soon as he landed in Western Canada.

He caused a sensation in Vancouver when he bought for more than \$1,200,000 one of the largest office buildings in the heart of the city and followed that by acquiring another office building for \$400,000. He then bought a Fokker airplane and announced that he would cruise in north central British Columbia to study the prospects for extending the Provincial Government's Pacific Great Eastern Railway into the Peace River country. He intimated that he might arrange finances not only for that undertaking but for the purchase of the railway by private capital. He boarded a

yacht to visit Victoria and talk things over with the Provincial Government, and on his way down the Gulf of Georgia, an island caught his fancy. He looked up the owner in Victoria and bought it. "It will be a pleasure resort," he said. "I'll put a golf course there, establish yachting facilities and build a club house. It would make an admirable sight for a pheasant farm, too, wouldn't it?"

It is difficult to believe that General Sutton accumulated all this wealth during his short association with Marshal Chang, so the people of Vancouver conclude that some rich Chinese are seeking a safe place for the investment of their capital through the medium of General Sutton, which, if true, would indicate that some of the Northern militarists are placing their funds far enough away, from China so that no matter what happens, they will not be confiscated. According to the Vancouver correspondent of *The New York Times* who furnishes the details of General Sutton's activities, British Columbians are not greatly concerned whether General Sutton is backed by Peking or Pittsburg capital. If he can put through a reasonable deal that will focus attention on the untouched resources of the Peace River country so as to induce the Provincial Government to spend enough money to finish the line to its original goal, he will be firmly established in the eyes of the Province as a military man who has won a victory of peace.

Does Trade Follow the Dollar?

American Materials on Chinese Railways

MR. A. P. WINSTON, of the University of Texas, writing in the *American Economic Review*, arrives at the conclusion that a lending nation does not enjoy the advantages derived from the sale of materials, and cites the Chinese railways as proof of his contention. He finds, from a study of the trade in railway materials to the countries of Asia and South America, that this class of merchandise has not been purchased with a prevailing regard for the nationality of manufacturers, but that each nation's trade has followed investment in proportion to its industrial capacity. French manufacturers, he declares, have not found a market even when large amounts of French capital have been placed and that American and German materials have been sold in large amounts where substantially no American or German capital has been employed.

As far as China is concerned, the investigations of Mr. Winston have seemingly been confined to the official import statistics and loan agreements which give one side of the case only. French capital has furnished the funds for the construction of China's railways to a much greater extent than appears on the surface. All the Russian lines as well as the all-French Yunnan line were built with loans raised in France. At least 65 per cent. of the Belgian and about 40 per cent. of the British railway loans were also raised in Paris. Outside of the Yunnan line, the French manufacturer did not participate in the supply of materials for any of these lines, but the reason for it is not difficult to seek. In the first place, the entire Franco-Belgo-Russo group of Chinese railways were exclusively political or strategical in character, designed to enable Russia to dominate China and create an approach from the northeast for the invasion of India. The main object of these railways was conquest. The interests of the French manufacturers were subordinated to the exigencies of the Russian alliance. On the other hand, Paris was the pre-war financial center of the world. London enjoyed this nominal distinction, but no important foreign issue was underwritten without a generous participation on the

part of the Paris bankers. The chief export of France was capital and the manufacturing interests of the nation were sacrificed to those of the issuing banks who practically controlled the investments of their depositors. It was not until the early part of 1914 that the Association of French Manufacturers protested against this system and demanded that in future French materials be conceded participation in all foreign development enterprises, equivalent to the proportion of the loans subscribed for in the French market. The war intervened to prevent the carrying out of this program.

The United States is rapidly drifting into the same position as pre-war France. The necessity for seeking profitable fields for the investment of our surplus capital is gradually overshadowing the importance of creating and retaining markets for our manufactures. In the competition for profitable investment, American capital will also subordinate the interests of our manufacturers to the most favorable rates of interest. We will soon reach the point, if we have not already arrived there, where our first consideration will be the direct returns on our foreign investments, and our money will flow out of the country in the same way it did from France, until some day American machinery manufacturers will also demand from their government more stringent supervision over foreign loans in order to preserve their markets.

There are two sides to the question raised by Mr. Winston. Trade in general may be greatly stimulated in the export of raw products as happened in the case of Germany who doubled her purchases of cotton and copper in the United States since our bankers took over the major share in the Dawes plan loan. The same favorable trend is seen in South America, where the United States has replaced Great Britain since the war as the chief source of capital, resulting in a doubling of our exports in general. These figures indicate that trade does follow the dollar, but we take it that Mr. Winston seeks to prove that it does not follow in the sale of manufactured products in the shape of railway rolling stock

and industrial equipment. Unless specifically provided for in the loan agreement, international competition is so great that invariably the orders for materials will go to the lowest bidder. The only reasonable protection the lending nation can impose is, that given equal quality and prices, its materials will be given the preference, and then leave it to the engineer in charge to see that the specifications are drawn up to favor the industry of the lenders. This clause in the loan agreements invariably works out to the advantage of the lenders. In China, all investigations to the contrary, it resulted in equipping the loan built railways with the standard practice of the nations furnishing the money for construction.

Mr. Winston says, "that from an examination of the seventeen important Chinese Government railway loan contracts with Americans and Europeans from 1898 to the outbreak of the war in 1914, it appears that the lenders' nationality has been uniformly denied a preference over better offers from other sources. In every case but one the lenders are made purchasing agents, but in every case but that same one (The North China Railways) it is stipulated in varying terms that the purchases must be made in the best or open market. In every case purchases were subject to Chinese official control; in seven cases out of the seventeen, tenders were to be called for by the Chinese Government, and in ten cases there are further checks on purchases—orders being placed by agreement between the lenders and the Chinese or subject to specific approval by representatives of China."

"It is ordinarily agreed," continues Mr. Winston, "that the chief engineer shall be of the lenders' nationality; but in thirteen of the seventeen contracts he may be selected jointly by the lenders and the Chinese Government, or at least with the approval of the government, and in ten cases he was expressly subject to Chinese control. The lenders' nationality was in ten contracts given a preference, but in all except one case only if materials were not obtainable in China (as to a considerable extent they have been) and only in case the lenders' nationality offered goods at equal prices and of equal quality. This seeming advantage would, however, seldom be of value if the requirement of competitive purchase were observed. It has been shown that prices in such bidding are seldom equal."

"It seems true, however, that in some instances foreigners acting as purchasing agents for the Chinese Government have profited by a violation of a well-defined trust, depriving the Chinese of the advantage of competition guaranteed by contract."

Mr. Winston's mention of purchasing agents having profited by a violation of a well-defined trust, invites attention to the causes which gave birth to the system. A new school of American writers is now actively engaged in writing books on "Imperialism" and amongst other things point to Chinese railway loan agreements and the imposition of purchasing agents, as one of the instruments specially invented by foreign exploiters to maintain China in economic servitude. The first foreign railway loan to China was issued by the British and Chinese Corporation for the Imperial Railways of North China, now the Peking-Mukden line. At that time the idea of appointing a purchasing agent had not been thought of; the British group relying on the appointment of an engineer-in-chief of its own selection to see that the orders for materials went to British manufacturers. Instead of placing the orders through the financing corporation, the engineer-in-chief prevailed upon the Chinese officials to appoint a firm in London as exclusive purchasing agents under a contract giving them a five per cent. commission. The British corporation which floated the loan on exceptionally favorable terms in the hope of deriving a small profit from the supply of materials was indignant at this breach of faith and when the next British railway loan was negotiated, insisted on being appointed purchasing agents with the same compensation. The purchasing agent system which has since been so bitterly assailed as unfair and a restriction on Chinese rights, was originated by themselves. In adopting the standards of the North China Railways for all Chinese railways and attempting to build all the locomotives and rolling stock for other state railways in the shops of the North China Line they gave a virtual monopoly to one firm for the purchase of all materials required for all Chinese railways. This was a condition that no lending nation could accept and from the American viewpoint it constituted a gross violation of the Open Door principle. The British and other foreign lenders, had to insist upon the extension of the purchasing privilege to themselves in order to obstruct the creation of a purchasing monopoly that would have taken toll of every new railway constructed.

Mr. Winston goes on to say that "just before the outbreak of the Great War, the railway mileage of China was somewhat over 6,000; of this the government lines built with foreign capital had a total of about 2,800 miles. The remainder consisted of French and German companies (600 miles) whose purchases were closed to international competition by the terms of their charters; the Russian and Japanese roads (1,900 miles); and 1,000 miles constructed with Chinese capital. The following table arranged by Mr. Winston, shows the importance of the five nationalities chiefly concerned, as lenders for government railways in China and as sellers of rails and rolling stock for the entire railway system of China (including sales for other lines as well as those built with government loans) for the years 1898-1912.

From	Railway Loans to Chinese Government	Export of rails and Stock to China. Value	Rolling Percentage of capital loaned for railways
United States ...	\$ 3,000,000	\$11,485,000	382.82
Germany ...	29,761,000	9,473,000	31.79
Great Britain ...	52,394,000	6,898,000	13.16
France ...	27,100,000	651,000	2.40
Belgium ...	11,600,000	12,851,000	110.78
Total ...	\$123,855,000	\$41,349,000	

The above table would indicate that without advancing any large amount for construction, the United States had benefited from the sale of materials to a larger extent than the lending nations thus bearing out Mr. Winston's argument. However, all the facts are not there. The secret of America's sales of rails and rolling-stock to China up to 1912 is explained by the fact that we furnished most of the locomotives for the Chinese Government Peking-Kalgan line and practically all the rails, bridges, locos and rolling stock for the South Manchuria Railway. Japan borrowed the funds for rebuilding the old Russian line in London and spent them in America for materials. Time was the essential factor in the contract. The British manufacturers could not promise delivery under six to eight months; the United States Steel Corporation guaranteed immediate delivery and chartered a fleet of steamers to carry out the contract. The figures quoted by Mr. Winston represents almost in their entirety the sales of American railway equipment prior to 1912 to the Japanese South Manchuria Railway and the Peking-Kalgan line of the Chinese Government. In no case were these materials supplied to the British, French, Belgian or German loan-built lines, which were equipped throughout with materials representing the standard practice of each lending nation.

Up to 1921, the South Manchuria Railway had purchased nearly \$50,000,000 worth of American materials of all kinds for the railway and its industrial enterprises. Approximately another \$25,000,000 was expended in America by private Japanese firms in equipping industrial plants in the railway zone. Since then, probably another \$25,000,000 has come to American railway manufacturers from the South Manchuria Railway and its allied concerns, or a total of \$100,000,000 in orders from a railway that never borrowed a dollar from us. THE FAR EASTERN REVIEW has repeatedly invited attention to this important economic situation which discloses that the Japanese South Manchuria Railway has purchased American materials without advancing them a cent, to the same extent as though we had financed all the Chinese Government lines. In addition, when the Japanese operated the Shantung Railway during the war, out of a total expenditure of \$10,000,000, over \$6,000,000 went for new American equipment. The rails and bridges for the Kiukiang-Nanchang Railway built by the Japanese for the Provincial Kiangse Railway were also purchased in the United States. The Japanese have never been paid either principal or interest on the funds they advanced for the construction of this line.

The results of Mr. Winston's inquiry while interesting, are hardly convincing. Borrowing governments, will if left free, buy their requirements in the cheapest markets, but in the future as in the past, it will work out that the manufacturers of the lending nation will have a preferred position, if not through some definite provision in the loan agreement, then by the preparation of specifications drawn up by the engineer in charge, appointed to see that the orders as far as possible come to the nation furnishing the loan.

G. B. R.

British Trade and Industry

By Gilbert C. Layton, Assistant Editor of "The Economist"

(SPECIAL TO THE "FAR EASTERN REVIEW")

The Vickers-Armstrong Fusion

THE outstanding event in the iron and steel world in the past month has been the announcement of a scheme by which interests of the two great engineering and armament firms of Vickers and Armstrong, Whitworth are to be brought together under the control of a new company. The scheme embraces the greater part of both businesses and the whole of the armament interests of each undertaking. The name of the new company, which is to be formed before the New Year, will be Vickers-Armstrongs Ltd. Its initial share capital will not exceed £21,000,000. Vickers will be the major partner in the combination, its interests being roughly twice those of Armstrong's. Moreover, its value as a profit-earning asset is undoubtedly greater than the ratio of its interests suggests. Vickers enters the new company with its house in order, for it has carried through its post-war financial readjustments, which involved the writing down of about £12,000,000.

Armstrong's finances, on the other hand, are most unsatisfactory. In fact, a circular issued by the company states that, while the full extent of its losses cannot yet be accurately gauged, they are certainly not less than £11,000,000. Clearly a reorganization must be undertaken sooner or later. The fact that the future of the new company is viewed with a considerable measure of confidence would seem to be indicated by a somewhat novel insurance scheme. There is an insurance for £200,000 annually for five years should the profits fall short by that amount in any of those years. On the assumption that profits amount to £900,000, there would be a balance equal to approximately 4½ per cent. for the ordinary shareholders. The amalgamation has been cordially welcomed and is undoubtedly a step in the right direction. It is to be hoped that other undertakings engaged in the "heavy industries" will follow this example, for rationalization on these lines is one of the chief hopes—if not the chief hope—of regaining a tolerable measure of prosperity.

The Misfortunes of the Coal Industry

In less enlightened days one might have been forgiven for believing that a curse rested upon the British coal mining industry. Its misfortunes, already legion, continue to increase. A full-dress debate on the condition of the industry had been arranged in Parliament, but the proceedings had scarcely started when the sitting had to be suspended owing to disorder. It was widely regretted that a valuable opportunity was thus lost of drawing—or should one say redrawing?—the nation's attention to the gravity of the coal industry's position. And this position worsens with the passing of time. Let us glance at a few significant figures. At the end of last month—October—the total number of insured persons in the industry unemployed was over 223,000 and short time was being worked extensively. The working of the industry in the June quarter disclosed a debit balance of £2,856,000, or 1s 0.65d per ton disposable. Later figures are expected to be even less favorable. Nor are the figures of exports encouraging.

Clearly the remedy which ought to have been applied long ago will have to be applied sooner or later—and the sooner the better. That remedy is summed up in the one word "rationalization." More fully, there should be amalgamation of efficient units, district regulation of output quotas, pooled wagons and co-operative sales agencies. It is admitted that these measures will not give immediate and overwhelming prosperity to the industry as a whole. But it is contended that they will give tolerable prosperity to a large section of it. On the other hand, the present policy of "waiting for something to turn up" is involving the entire industry in the gravest difficulties. One prominent coalowner has recently given "rationalization" his blessing; but many others remain to be convinced of its merits. And even then time will be required for the working out of details. Thus the immediate outlook for the British coal industry is by no means bright.

Road Transport

This month road transport problems have engaged a large measure of attention, for the Annual Exhibition of Commercial Motor Vehicles is being held in London, which has also been the venue of two important expert congresses—namely, the World Transport Congress and the Congress on Public Works, Roads and Transport. Motor transport is a factor of the greatest importance in the modern world. According to a census compiled by the United States Department of Commerce, the total number of registrations in the world at the end of 1926 was 4,131,339 vehicles. It is noteworthy that there are substantially fewer commercial vehicles than private cars in the world, the latter on the same date numbering 23,518,929. The number of commercial vehicles, however, is increasing rapidly throughout the world, and particularly in countries outside Europe and America.

Turning to the position in Great Britain in particular, the number of vehicles registered on January 1, 1927, was 260,504. An examination of the registrations in recent years indicates that the rate of expansion, though less rapid than in the world as a whole, is great enough to give rise to a number of problems. It largely accounts, for instance, for the enormous annual expenditure on roads, this figure being something like £45,000,000. Again, the view is widely held that road transport is having a detrimental effect on railway revenue. It is possible, however, that the influence of the motor vehicle in this direction has been exaggerated. At any rate, there is no essential hostility between road and rail. As Mr. E. H. Davenport, in his recently published thoughtful brochure, "Railways versus Roads" (published by the London General Press, London, price one shilling) puts it: "Allied with motor transport, the home (British) railways can boom: opposed to it, they will go on languishing—Co-operation, not war, should be the order of the day."

Soviet Bid for American Capital in Manchuria

WE have been so accustomed to being told about the wonderful development of Manchuria as the result of the working of the South Manchuria Railway, and the determination of Japan to maintain law and order in the territory served by her lines, that it comes somewhat as a surprise to find that the agent of the Chinese Eastern Railway is using the Japanese argument to interest Americans in that part of China. Mr. I. I. Kounin, representing the publications department of the Chinese Eastern Railway, in his travels tells American manufacturers that the population of North Manchuria has increased 700 per cent. in the last twenty-five years and offers to them one of the world's most fertile trade fields. Twenty-eight American manufacturers are now represented in Harbin. Mr. Kounin tells us that people in the United States are inclined to believe that Manchuria is war-torn and economic progress stifled, but he points out that although the rest of China is having its troubles, Manchuria is peaceful and has not engaged in warfare for 25 years. He fails, however, to add that the rest of China is in chaos as the result of the Soviet's intervention in its internal affairs and that the peace and tranquility that reigns in Manchuria is due entirely to the presence there of the Japanese who will not permit the province to become the battle-ground of contending factions. He goes on to say that the products of North Manchuria are grain, wool, bristles and fir products and that the people of that province are in the market for virtually all the manufactured products of the United States. There is a tremendous outlet there for American machinery, footwear, automobiles and railway equipment.

"Manchuria has passed through the chaos of changing conditions, following the great war, to an era of prosperity that to-day makes it the most desirable export market available to us in China. This development has been going on swiftly through the years. Manchuria's steady growth is indicated by the increase of its exports. In 1913 the export tonnage amounted to 600,000 tons, which in 1925 had been increased to 2,360,000 tons, and in the last fiscal year to 5,000,000 tons. Our railroad is being operated profitably. The net profit for the railroad in 1926 was \$12,500,000."

We are also informed that in order to develop the trade of Manchuria, the Soviet Government has exempted from payment of income tax, persons and firms doing business with that territory *via* the port of Vladivostok.

The Tass Agency says the exemption will apply to "all persons living out of the U. S. S. R. and also all foreign societies and companies whose head offices are established abroad in regard to all revenues obtained from trade, transport, commission or credit operations connected with the import and export of goods to Manchuria and from Manchuria *via* Vladivostok."

Here we have another angle of the constant fight to place obstacles in the way of Japan's further commercial penetration northwards into the zone held by Russia as a special preserve. Whatever we may think of the Soviet tactics, it is only fair to point out that the new law is on a par with the British regulation and the American China Trade Act exempting from taxation its firms operating in China. As Russia has lost her extraterritorial privileges, and cannot extend this tax exemption to her firms in China, she is meeting the competition by extending the exemption to foreign firms making Vladivostok their headquarters for Manchurian trade.

Abyssinia Adopts China's Tactics

ABYSSINIA seems determined to follow the lead of China in stirring up trouble by entering into development contracts with American companies which conflict with rights previously ceded to other Powers. In 1902, the Emperor of Abyssinia signed a treaty with Great Britain in which he engaged not to construct or allow to be constructed any work across the Blue Nile, Lake Tsana or the Sobat which would arrest the flow of water into the Nile, except in agreement with the British Government. Last year Italy and Great Britain furthermore agreed not to interfere with

each others plans in Abyssinia. Italy recognized the exclusive right of Great Britain to deal with the waters of Lake Tsana and Great Britain agreed not to oppose any Italian scheme for railway development in Eritrea which might affect Abyssinia.

This last agreement is almost identical with the many understandings that split China into spheres of influence and was interpreted by the Abyssinian Government as an infringement on its sovereignty and a menace to its independence. In order to circumvent its provisions, it appears that Abyssinian agents entered into negotiations with the well-known construction firm of J. G. White & Company to build a dam across the Blue Nile at Lake Tsana, which being on Abyssinian territory, would give to the government of that country control of its waters and enable it to sell water for irrigation purposes in the Soudan and Egypt. Such a dam and the resultant storage reservoir would form an integral part of the system the British have already built below and bring the great cotton crops of the Soudan and the Nile Valley under the control of Abyssinia.

We are now informed that the Abyssinian Government has signed a \$20,000,000 contract with J. G. White & Company covering the construction of the dam and an operating concession for the water. It is furthermore announced that if the American firm is not permitted to carry out its contract, the dam will never be built by British interests.

The British Government is determined that no other nation shall build a dam across the Blue Nile and compel Egypt and the Soudan to pay tribute for waters that find their natural outlet through these territories. Although the question has not yet reached the diplomatic stage, all the elements of a first class row seem to exist. We have here almost the exact duplicate of the few American development contracts with the Chinese Government. American firms still hold the contracts but they will never be carried into execution.

Last year, considerable excitement was created in the United States when it was learned that powerful British interests had obtained an extensive mining concession in Panama adjoining the Canal Zone. This has been supplemented by another and still larger oil concession in Colombia on the Panama border. Panama and Colombia are sovereign states and the United States can not complain. An American company now obtains a contract that, if carried out, brings the Soudan and Egypt under tribute and it is Great Britain's turn to squirm. And so it goes.

G. B. R.

Civil Law in Japan

Making Western Law Aid Eastern Custom

By Kokuro Usami, Judge of the Japanese Consular Court in Tientsin, China

SOME fifteen years ago, after finishing my middle school education in a town in Hokkaido—North Japan—I went up to Tokio to enter the First National College. In Tokio I met an old lady who was very proud of the fact that she had been born in Tokio, or old Yedo, and had never lived elsewhere. She asked me whether there was a policeman in Hokkaido or not. Not a little startled, I replied, "Oh, yes, there are plenty of them."

"How do the policemen drive the bears out of the town? Towns in Hokkaido are haunted with bears, aren't they?" she said.

It took my breath away. I did not know how to answer. But I also met a school girl, who remarked that the bears in Hokkaido were of a different kind from those of the mainland, being of a reddish brown color, and having no white collar around their necks; also she said there were no bull frogs in Hokkaido.

During my two and a half years' stay in Tientsin I have met quite a few foreigners—well educated men and women—who know Japan just as this old lady knew Hokkaido, though I've not come across any foreigner whom I can compare with the school

girl. I've heard that some Westerners look on the novels, *Kimono* and *Sayonara*, as the most suitable books for getting reliable information about Japan, and certain Japanese reviews put on at the Empire theater and others as typically Japanese.

Furthermore, I have found not a few Western ladies who do not doubt that the Japanese husband can divorce his wife at will. Apart from this quite a number of people believe that the administration of justice in Japan is very corrupt: that foreigners do not get justice in the Japanese courts and so their government should not agree to give up their consular jurisdiction in China. Whereas amongst 169 mixed civil cases heard and decided in Osaka courts in 1923, 1924 and 1925 I can count 41 cases in which foreigners won and 57 cases in which foreigners lost, the rest of them being settled by compromise either in or out of court. In our Tientsin Japanese Consular Court in 1924, 1925 and 1926, 31 civil suits were brought by foreigners against Japanese and only four of them lost the case. I have about 10 rough sketches of the most interesting cases at hand, *e. g.*, the United Artists' Corporation vs. T. Katagiri, in which the plaintiff company sued for damages for their copy-

right of the moving picture, "Through the Back Door," in the Osaka court; the Deutsche Bank vs. Y. Nishiwaki; K. Fujii vs. Sunrise Assurance Company; the Congregational Mission Board vs. N. Nakawawa, etc. But if I dwell on these minor items or explain why I cannot divorce my wife at will I shall not be able to discuss my principal subject. However, the fact that there is still such misunderstanding amongst Western people is the motive which compels me to discuss this subject in spite of my limited knowledge of English.

In countries such as Great Britain and the United States, where the law, or rules of the law are "declared" in judgments and decrees of the court, the difficulty of framing a new code of laws, particularly such an important code as the civil code, is scarcely realized. Even the Western nations whose systems of law are after the continental fashion, i. e., the system of enacting the written laws and codifying the most important groups of them—even they could not possibly understand what it meant for an Oriental people and government to adopt the Western system of law, which they had to do since they already had taken into their social life various forms of Western civilization.

The theory of jurisprudence, that the law must arise from the needs of the people as shown in their lives and not be artificially constructed by the brains of a few scholars, has much truth in it, if not the whole truth. Legislation after the Western fashion made in Oriental states where the people's mode of life is so far different would seem somewhat absurd. Of course, there are precedents in history where the adoption of foreign law has had good results, e. g., the adoption of Roman law by the different European countries. But the framing of a new system of law made in a comparatively short period of time to meet the necessity of the revision of the unequal treaties seems to me an unprecedented feature.

There are great difficulties in this. The people desiring the treaty revision demanded an immediate reformation of the legal system, but one who knows what it would be to a nation to be governed by the laws which are in reality a mere interpretation of the laws of another country, could never agree to these impetuous demands. The defects of law cannot be so easily corrected as some people think. Now China faces the urgent necessity of framing a modern code of law. Japan was faced with exactly the same difficulty, and has accomplished that work. Not to speak of the "constitution;" that is, the Magna Charta of Japanese history which was granted in 1889 by a kind and loving ruler at the expense of his inherited and long established rights, it took Japan more than thirty years' hard work from 1870 to frame the whole system of modern Japanese law, which includes the civil law, the criminal law, laws of civil and criminal procedure, commercial law, and many other laws. The most important part of law which is not yet enacted in China is the civil law. I hope it will be of some interest to you to consider a brief history of the framing of the modern civil code in Japan. By the word "civil law" I mean rules of law relating to persons, natural and legal things, rights in things, obligations of different kinds, and the law regulating personal and family relations and succession or inheritance.

In the year 1870, three years after the Meiji Restoration, Japan established a commission for the purpose of drafting new systems of law. As the first step, the committee translated all the codes of French law, the special committee for the drafting of the new civil code being appointed in 1875. The Japanese scholars of this committee, after thorough investigation of customs and usages of the people, took the part of drafting the rules of family relations and succession, and Mr. Boasonade, a French jurist, was responsible for making all other parts of the civil code. This draft, after careful examination by a larger commission, was promulgated in 1890 and was to come in force after three years.

A spirited discussion arose whether the draft should come into operation or not, not only in scholastic circles but also in the business and political world. Most of those who were opposed to a speedy execution of the new law were scholars of English law and those who were in favor were scholars of French law. There were two different groups of opposition, those who insisted on further correction of the draft, and those who wanted to have an entirely new draft made. The grounds of this opposition were generally speaking as follows:

(1) The new law would corrupt Japanese morals. The national belief makes "iye"—which means a house in its moral sense, not exactly a family—a social unit, where the spirit of the ancestors is

enshrined in a family altar. An individual does not count. The new law making an individual the unit of community would naturally dismember "iye"—the holy place of ancestor worship, and would remove the keystone of the people's faith.

(2) The new law would not fit the national spirit of Japan. It savored of the bloody French Revolution, where the people's rights were extorted by force from an unwilling monarch, their common enemy. In Japan the people's liberty and rights had been granted freely by their benevolent sovereign.

(3) The new civil code, having individualism as its philosophical basis was likely to be abused as a weapon of the capitalist against the proletariat and would stimulate abnormal growth of radical socialism.

(4) The new civil code was not in accord with the rules of the constitution, the taxation law, and would inconvenience the making of the budget to a large degree.

(5) The new civil code contained unnecessary scholastic explanations in its texts.

The supporters of the new code claimed these assertions to be based on pure misunderstanding, emphasizing that the revision of the unequal treaties—which had been depriving Japan of her sovereignty—could not be attained without framing new codes of law. They insisted that the old Japanese customs were fully accepted in the sections dealing with family relations and succession, and so it would never demoralize the old Japanese belief in ancestor-worship. Further, they said that to administer justice without fixed codes of law is to deny the protection of the people's rights, because it not only allowed the courts too great a latitude, but also encouraged unnecessary lawsuits. Both parties established offices as the headquarters of their campaign. It would become an enormous volume if I compiled the documents of this controversy. In the year 1892 a bill for postponing the execution of the code was brought before the diet and after a warm debate for several successive days it passed both houses. It was decided in this bill that the new code should not come into operation until 1896, meanwhile necessary amendments should be made.

The general atmosphere of the time seemed to be in favor of fundamental reconstruction of the draft. Mr. Boasonade, who had been expected to live in Japan for the rest of his life, was said to have changed his mind. We can look at this controversy from different angles, but I quite agree with some scholars in asserting that looking from the standpoint of legal science this was a dispute between the school of natural law and the historic school.

The school of natural law, as you know, believes in the existence of *rex naturalia* based on human nature, which supersedes time and space. The historic school claims that the law must be a thing born from the nature and life of the existing nation which changes from time to time. This is something similar to the famous controversy which occurred in Germany between Thibaut and Savigny in the early half of the nineteenth century concerning the codification of German civil law. On that occasion Thibaut, representing the naturalistic school, emphasized the necessity of enacting one common code of civil law to govern the different nations of the Empire for the purpose of unifying the country, which they called "Volkseinheit." Savigny, as an historic jurist, said that to unify the German peoples by making one common code of civil laws was as much possible as to unify the different languages by making a dictionary.

Hot and spirited as the above said controversy in Japan was, it was a fair play of Japanese *samurai* spirit. After the said bill passed the diet, the leaders of both sides formed one drafting committee and started again the difficult task of amending or rather remaking a new draft. The new committee, consisting of three of the best scholars of that time—one of them is still alive—referred to the different civil codes of the world, French, German, Austrian, Swiss, Italian, Dutch, Belgian and Anglo-American. They made a new draft after the Pandekten system, consisting of five parts. This was promulgated between 1896 and 1898 and came into operation in 1898, one year before the treaty powers actually gave up their consular jurisdiction in Japan.

I hope that what I have herein set forth will convey to you some idea of the difficulties with which Japan had to cope and also gain your sympathy with China, which, with her vast territory, different races, and many conflicting civil and commercial usages, is trying so hard to frame a modern civil code which will be best fitted for her own people and at the same time satisfactory to foreigners.

English Electric's New Chairman

MR. WILLIAM LIONEL HICHENS, who has been appointed chairman of The English Electric Company Limited, in succession to Mr. P. J. Pybus, was born in 1874 and educated at Winchester and New College, Oxford. Since 1910 he has been chairman of Cammell Laird and Co., Limited, of Sheffield, Birkenhead and Nottingham, which firm also holds the ordinary shares of the Midland Railway Carriage and Wagon Co., Limited, of Birmingham; while other industrial undertakings over which he presides as chairman include the Leeds Forge Co., Limited, the Newlay Wheel Co., Limited, and the Tranmere Bay Development Co., Limited. In addition, he is a director of the London Midland and Scottish Railway, the Dundalk, Newry and Greenore Railway, and the Power and Traction Finance Co., Limited. Mr. Hichens, who is a member of the Carnegie Trust, was at one time a member of the Egyptian Ministry of Finance, while other high offices which



W. L. Hichens

he has held include that of Colonial Treasurer of the Transvaal and Treasurer of the Inter-Colonial Council of the Transvaal and Orange River Colony. In 1907 he went to India as a member of the Royal Commission on Decentralisation, and in 1909 was chairman of a board of inquiry into the Public Service of Southern Rhodesia. In 1915 he visited Canada on behalf of the Ministry of Munitions, while he has also been a member of several reconstruction committees and of the Advisory Council to the Ministry of Munitions on the Disposal of Surplus Government Property. Other bodies to which he has been elected include the Advisory Committee to the Department of Overseas Trade, the Industrial Fatigue Research Board, and the Consultative Council of the Import and Export Restrictions Department of the Board of Trade. Mr. Hichens has at all times been considerably interested in the labor problem and is the author of treatises relating to the functions of the Government in relation to industry, the new spirit in industrial relations and the problems of modern industry. He has also delivered lectures on the labor question before many of the learned societies.

Revised Procedure for the Provisional Registration of Patents by Foreigners in China

(Translated by N. F. Allman)

THE MINISTRY OF INDUSTRY, NOTICE No. 2,
PEKING, SEPTEMBER 5, 1927

WHEREAS, it has been found necessary to revise the "Procedure for the Provisional Registration of Patents by Foreigners" promulgated and put in force by the Former Ministry of Agriculture and Commerce on June 8, 1927. Therefore this Ministry has now revised said procedure and hereby announces the "Revised Procedure for the Provisional Registration of Patents by Foreigners," in nine articles as follows:

1.—Any treaty power citizen who has a patent from his own government, or from another government, or has acquired same by inheritance or assignment, for an invention, discovery, or new method in the industries may during the validity of said Patent, and pending the promulgation of a formal patent law in China, apply to this Ministry for Provisional registration, subject however to the requirements of any formal Chinese patent law hereinafter promulgated.

2.—A provisional registration receipt shall be issued by the Ministry of Industry, but neither such a receipt nor the approval of an application in respect of an article, or new method shall be deemed a grant, or formal registration of patent rights. Nevertheless whenever a formal patent law is promulgated the date of the application shall be deemed, in respect of priority, as equivalent to an application for patent rights. When applications are made by post the date of posting as shown by the stamp of the receiving post office shall be deemed the date of such application.

3.—The provisional registration may be of three kinds, *viz.*,
Patents
Utility Models
Designs.

The applicant should be guided in making his application under the above by his original letters patent, or other documents. Applications concerning drinks, foods, drugs, medicines, munitions of war and contraband articles shall not be registered.

4.—In making application for provisional registration an application must be made for each article and must be written in Chinese in unambiguous language in accordance with the forms prescribed by the Ministry of Industry. All other documents must be translated into Chinese and submitted to the Ministry of Industry together with a copy of the foreign language version.

5.—The applicant must submit to the Ministry of Industry for examination, the original of the letters patent, or a copy thereof, or other document issued by a patent office, together with a detailed statement of methods of manufacture and drawings and specifications.

6.—Applicants for provisional registration must submit a certificate of nationality. Corporations must submit documentary evidence of their formation.

7.—The holder of a provisional registration may assign his rights to others but such assignments must be over the signature of both parties and the deed of assignment must be sent with the application to the Ministry of Industry for approval and record.

8.—An applicant having no place of residence or business in China may appoint an agent who has a place of residence or business in China to effect provisional registration. A power of attorney must accompany each application filed by an agent.

9.—The following fees must accompany each application for provisional registration of patents or assignments thereof.

Application Fee	Provisional Registration Fee	Application for Assignment of Provisional Registration Fee
Patents	\$5	\$20
Utility Models	\$3	\$15
Designs	\$2	\$10

The provisional registration fee shall be refunded if the application is rejected.

The Automatic Telephone in Shanghai

TO the great marvel of those who have been in touch with Far Eastern affairs during the last decade or so, the pace of progress in this part of the world seems to be constantly accelerating. The day of the automobile came, then the day of the radio, to spread like wildfire, particularly in Japan. Now comes the automatic telephone, not so very many years behind the West, at present being installed on a large scale, in Shanghai, long noted, but only now beginning to justify its soubriquet, as the New York of the East.

A system with a capacity of 10,000 lines is being installed in the Mutual Telephone Company's plant in this city, serving both the International Settlement and the French Concession. A portion of the new automatic exchange already has been opened supplying 1,000 lines in the Central Exchange Building, and the rest of the system is going into operation, at the rate of about 200 subscribers a week. Shanghai's new telephone directory, in fact, issued last month, has provision for the new numbers consequential with the improvement.

While the present capacity of the exchanges equipped with the latest time-saving and labor-saving development in telephonic communication is listed at 10,000, the dials being distributed with the transference of each subscriber to the automatic exchange permit of a possibility of 99,999 different calls, with five numbers instead of four, looking forward to the day when Shanghai's telephone population will run into the higher digits of the five-figure class.

The switchboard built for the new service for the Shanghai Mutual Telephone Company was manufactured by the Standard Telephones and Cables, Ltd., late Western Electric Companies, at their London and Antwerp factories. Virtually all the equipment needed for the automatic exchange arrived in Shanghai in recent weeks, and parts of it not ready for use have presented an imposing array in the show-rooms of the Company on Kiangse Road.

Installed at the instance of Mr. P. H. Cole, the alert and energetic Engineer-in-chief and General Manager of the Company, of Mr. C. M. Bain, the Chairman of the Board of Directors, and Mr. J. H. Wilson, the engineer now directly in charge of the work, this system is one that has been developed in the factories mentioned some years ago and already three quarters of a million 'phones are in operation with this system in nearly every country of Europe, as well as in New Zealand, Australia, South America and Mexico.

It is known as the rotary system, in which all switches work without upward or downward movement of the brushes, and are driven by motors attached to counter-shafting.

When the receiver is moved from the rest, it is equivalent of turning the handle on the magneto instrument. A humming note, equivalent to "Number Please," informs the subscriber that the apparatus

is ready to receive the call. The dialing then is proceeded with by the usual method of swiveling it to the stop from the various numbers indicated.

This system in Shanghai, besides eliminating the manual labor of the operator manipulating various keys and cords, testing the line to see if it is engaged, and then making the connection with another key and cord, will have the added advantage of eliminating the mistakes and misunderstandings that invariably arise in such a cosmopolitan community over difficulty in languages. This silent "operator" needs no interpreter and works solely in a language of numbers and electric currents.

In the automatic exchange being put into use here, every time a call is made, an important piece of apparatus known as the line-finder searches for the calling number along a magnetic scale and as soon as the contact is made, the particular telephone making the call is connected with the brains of the system, known as the Register. Receiving the impulses from each dial through this temporary contact, the Register stores them for passage to a group of connecting switches, known as selectors.

The first group selectors connect the calling line to the 10,000 group of numbers in which the number that is wanted may be located. The second group then connects with the special digit in the 2,000 class and the third connects the call to a group of 2,000 lines associated with this particular number and the final switches connect it with the actual number wanted. All these switches are operated by the register, based on the impulses stored there successively, and as soon as the call is complete the Register is disconnected automatically to devote itself to other calls.

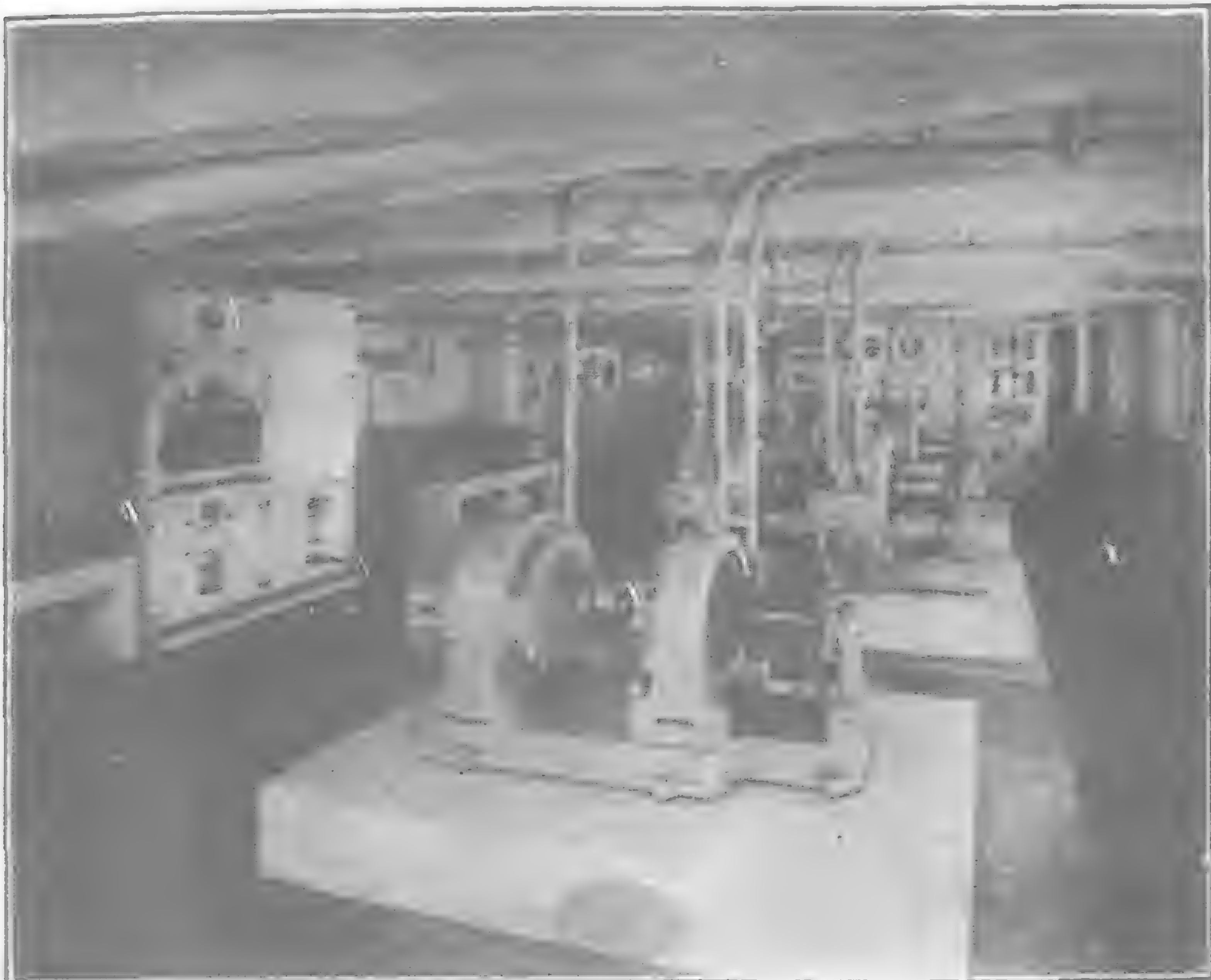
Co-incidentally with the operation of the line-finder and the register is the important Sequence switch moves through eighteen positions and back to zero, performing the functions during its progress at the correct times of connecting the dialing humming tone after the receiver is removed from the hook, the engaged or busy tone in cases when the line is engaged, and the ringing tone which tells the caller that the number dialed is free and is being rung.

Each connection and circuit of the Exchange is automatically supervised by a visual signal, a colored lamp, and also a buzzer, which show at once if any call has not been properly connected or if there is any fault in the apparatus. There are also signals indicating the progress of any call, and all these signals, used in the continual routine testing, keep the whole exchange under constant supervision of a small staff of workers.

So much for the working of the new apparatus. The installation has involved a complete change in the working of the entire telephone plant. In the basement of the central exchange the power that operates the system is generated from alternating Municipal current, transformed in the building to the direct current necessary for the operation of



The Automatic Switchboard



Generators and Power Plant



The Batteries

the apparatus. Some alternating machines also are used, and were the current from outside to fail entirely, the company has a battery room with the largest storage batteries in China, 4,000 ampere hours in capacity. As the motor generators are of 260 kilowatt capacity and 30 or 40 h.p., ample precautions have been taken to keep the exchanges going in spite of accidents.

It is marvelous, the manner in which every part of this complicated machine works with every other, and the many devices that are used to make it as near foolproof as possible. If a subscriber calls his number wrongly or too rapidly, a warning light glows and that subscriber is given instruction as to what he has done amiss.

Leaving the basement with its five-inch bars of copper to carry the heavy current, one goes to the third floor, where in a series of bays are the brains and the vitals of the system. Down a row of more than fifty feet are located several hundred revolving spindles each carrying fourteen discs. It is hardly possible that so many as fourteen persons will call into the same "hundreds" at one time, but the company has added four discs for good measure. These spindles furnish the power which throws the switches.

The switches themselves look something like the variable condensers in a radio apparatus, with this difference: Along their edges they carry thirty small hinged pieces of copper which make the final connection. When a call comes in, a little spindle ornamented with ten sharp spurs twists about and the revolving switch, hitting this, has three of its small copper contacts thrown out, which three depending upon the num-

ber. These small bits of copper then swing around to the back of the apparatus where they make connection with the rest of the switch, this latter being joined up with wires which transmit the impulse.

This apparatus might be called the viscera of the system, although it also contains considerable "grey matter" in that it automatically searches out the line upon which the subscriber has called and throws this call in upon a free circuit at the same time sending a humming note back to the subscriber to let him know that his instrument is ready for action. This machine really picks the number that call comes from out of all the other five thousand and gets it ready for action.

In between the time when the subscriber hears the note that tells him to go ahead with his call and its completion, a curious bit of apparatus, Mr. Wilson calls it the "brains of the system," stores up the number and finds out which lines are disengaged, whereupon it passes the number back to the main switches whose duty is to make connection. It was little short of marvelous to see this "register" send along impulses that the eye scarcely could follow although the ear could hear the faint clicks as the impulse ran along the apparatus.

These are the more spectacular items in the apparatus, but overhead run dozens of great lead painted cables which contain the many thousands of wires that connect the various parts of the system. The cables are so neatly laid and present such an air of grouping without crowding that one almost overlooks them entirely, yet without them the system would be dead.

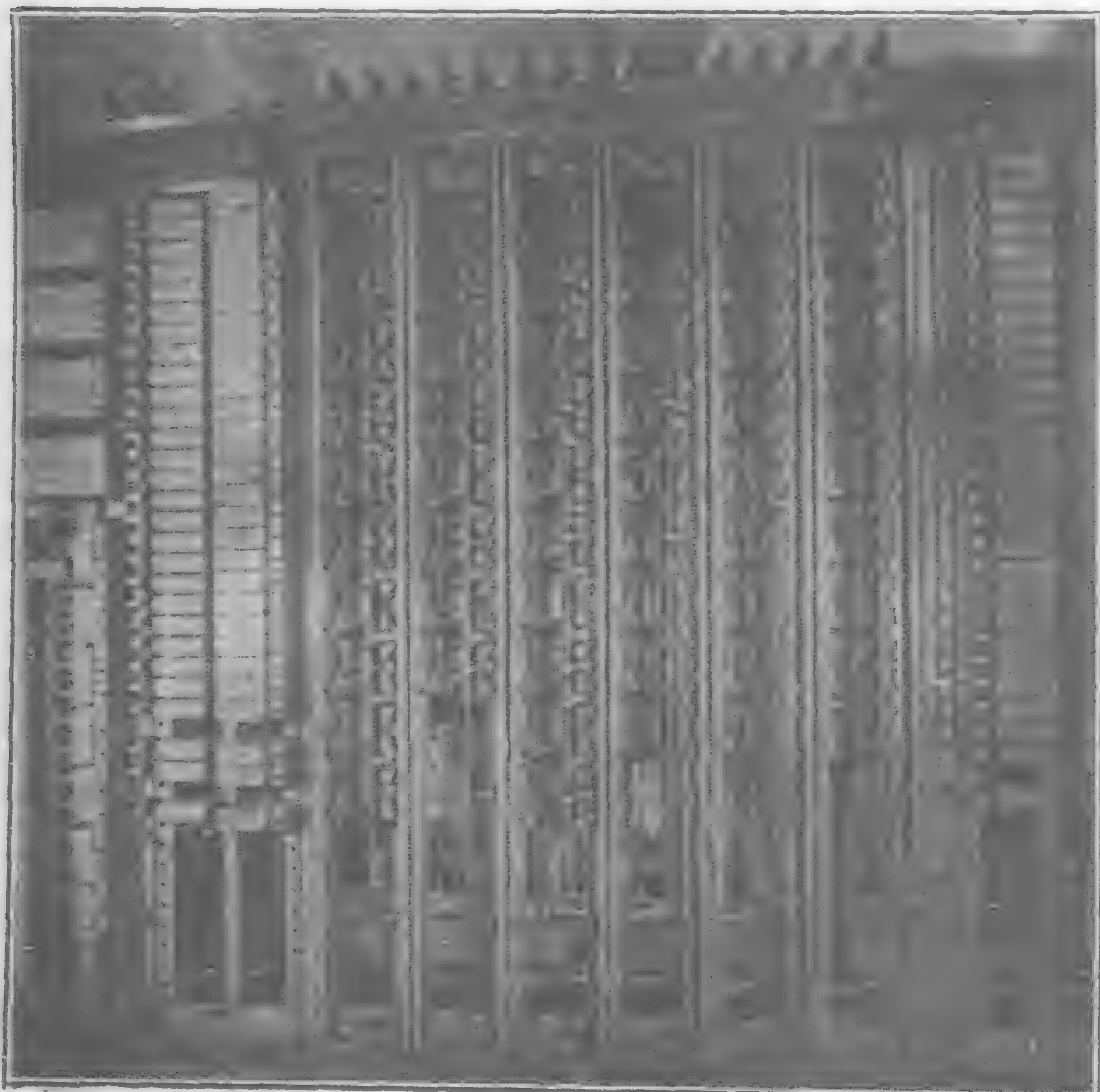


Another Section of the Apparatus



Second Line Finders and Third Group Selectors

While most of the apparatus came out in shape ready for installation, the connections did not and Engineer Wilson paid a high tribute to his 75 and more Chinese assistants who had been able to connect up the 75,000 wires with a minimum of errors.



Final Selector Bays

The rotary system adopted for the Shanghai public, according to Mr. Cole, is the only one of this kind in use in the Far East. Harbin and Dairen have automatic telephone systems, and there is one about to be installed in Tientsin, but these are all of the panel Siemens or Strowder variety, which function vertically.

The system going into use in Shanghai marks the new era of expansion and progress which seems to have been embarked upon in this metropolis, where building activity is proceeding with such rapidity and the foreign settlements are becoming more and more thickly populated, despite the uncertain political situation and chronic civil war in the interior.

Law Issued by National Registration Bureau, Ministry of Finance

Translated by N. F. Allman.

NANKING, CHINA, October 29, 1927.

Article 1.—Anyone carrying on business or trade under the jurisdiction of the Nationalist Government shall apply for the registration of same in accordance with the law.

Article 2.—Registration hereinunder shall be under the jurisdiction of the Registration Bureau, Ministry of Finance.

Article 3.—Registration shall be of the following classes :

- | | |
|-----------------|---------------------------|
| (a) Companies | (d) Banks |
| (b) Tradenames | (e) Exchanges and Brokers |
| (c) Trade Marks | (f) Mining Enterprises. |

Article 4.—Registrations as classified in the preceding article shall be effected by applying directly to the Registration Bureau, which shall issue registration certificates, except that the registration of tradenames may be effected within a limited time with the representatives designated by this Bureau at the situs of the trader. A trader whose capital is less than \$500 shall be exempt from registration.

Article 5.—Registrations effected with the government at Peking prior to May 1927 are hereby required to be re-registered with the Bureau of Registration of the Nationalist Government within three months of the promulgation hereof and for re-issue of registration certificates.

Article 6.—Where registrations have been effected with a provincial or municipal government prior to the promulgation of this law application shall be made to the Bureau of Registration of the Nationalist Government within three months of the promulgation hereof, for re-registration and re-issue of certificates.

Article 7.—Until the Nationalist Government has adopted appropriate procedure the several classes of registration referred to in article three above shall be governed temporarily by the existing old laws relating to the subject concerned.

Article 8.—The registration fees shall be temporarily the same as are provided for in the old laws, except that the registration fees for businesses and tradenames shall be fixed separately.

Article 9.—In case of re-registrations one-third of the existing fees shall be paid, except that such fees in respect of trade marks shall be paid at the rate of one-fourth of the old fees.

Article 10.—Applicants failing to apply for registration within the time limits fixed herein shall incur the penalties provided in the old law governing the subject concerned.

Article 11.—An educational fee of 30 per cent. additional shall be payable on all registration fees.

Article 12.—The regulations for the organization of the Bureau of Registration, and the detailed regulations for the enforcement of registrations shall be fixed separately.

Article 13.—This law shall be effective as of date of promulgation.

Shanghai Boasts World's Largest Diesel Generating Plant

FEW things have furnished a better index of the remarkable growth and expansion of the French Concession of Shanghai than the recent inauguration at the Lokawei plant of the French Tramways Company, otherwise known as the Cie. Francaise de Tramways et d'Eclairage Electriques de Shanghai, of the latest extensions of

the electric installations of the Company, making it what is claimed to be the largest and most powerful Diesel plant in the world.

The set of Sulzer-Diesel engines just put into operation at the Lokawei plant consists in a 5,250 horsepower, eight-cylinder, two-stroke motor, driving an Oerlikan alternator that gives the entire plant a total capacity of 12,000 kilowatt, with a prospective addition of a sixth set of Diesel engines to raise it to 16,000 kilowatt. The set just installed and put into running at an elaborate ceremony attended by numbers of distinguished visitors, such as the Paris General Manager of the Company, M. Laffargue, and French Consul-General Naggiar, was ordered in the spring of 1926, arrived at Shanghai at the end of last June, was completely erected by November 1, this year, and switched into operation on December 1. It represents an investment, together with the smaller plants successively installed during recent years, of six million taels.

The innovation, in fact, marks a period of expansion that began only seven years ago when, in 1920 the company decided to replace its old steam generating station of only 1,500 kilowatts, by a new Diesel engine. Soon another and then another unit to the establishment were added and the one that roared into action last month is the fifth and largest.

According to figures supplied by M. Monseran, the general manager of the company and by M. Fabry, the engineer in charge of the electric plant, the population of the French Concession, which at present is 300,000, is increasing rapidly. There are now, exclusive of the Tramways, 16,500

consumers of electric current in the Concession, representing an annual increase for the last few years of between fifteen and twenty per cent.

The Number 5 alternating current generator shown in the illustration is of Oerlikan make giving directly high tension current of 5,000 volts. It is driven by a Diesel motor and mounted at the

end of its shaft. The Diesel engine made to order by Sulzer Brothers in Switzerland has a speed of 125 r.p.m. and the cylinders are of 76 cm. diameter. The scavenging air is supplied by a separate turboblower electrically driven, instead of being supplied by compressors driven by the engine itself.

The principal building of the present installation, shown in another of the illustrations, was constructed in 1919, the decision to erect the new plant being induced by the growing needs of the Concession and chiefly because of the inadequate water frontage and the poor quality of coal obtainable. It is a huge structure of reinforced concrete with parabolic arches, 20 meters high, 25 meters wide and 60 meters long. This huge hall, described in greater detail in an article appearing in THE FAR EASTERN REVIEW in January, 1926, on the occasion

of the installation of the fourth unit, holds not only the generators, but a sub-station containing rotary-converters for the transforming of current supplied the tramways.

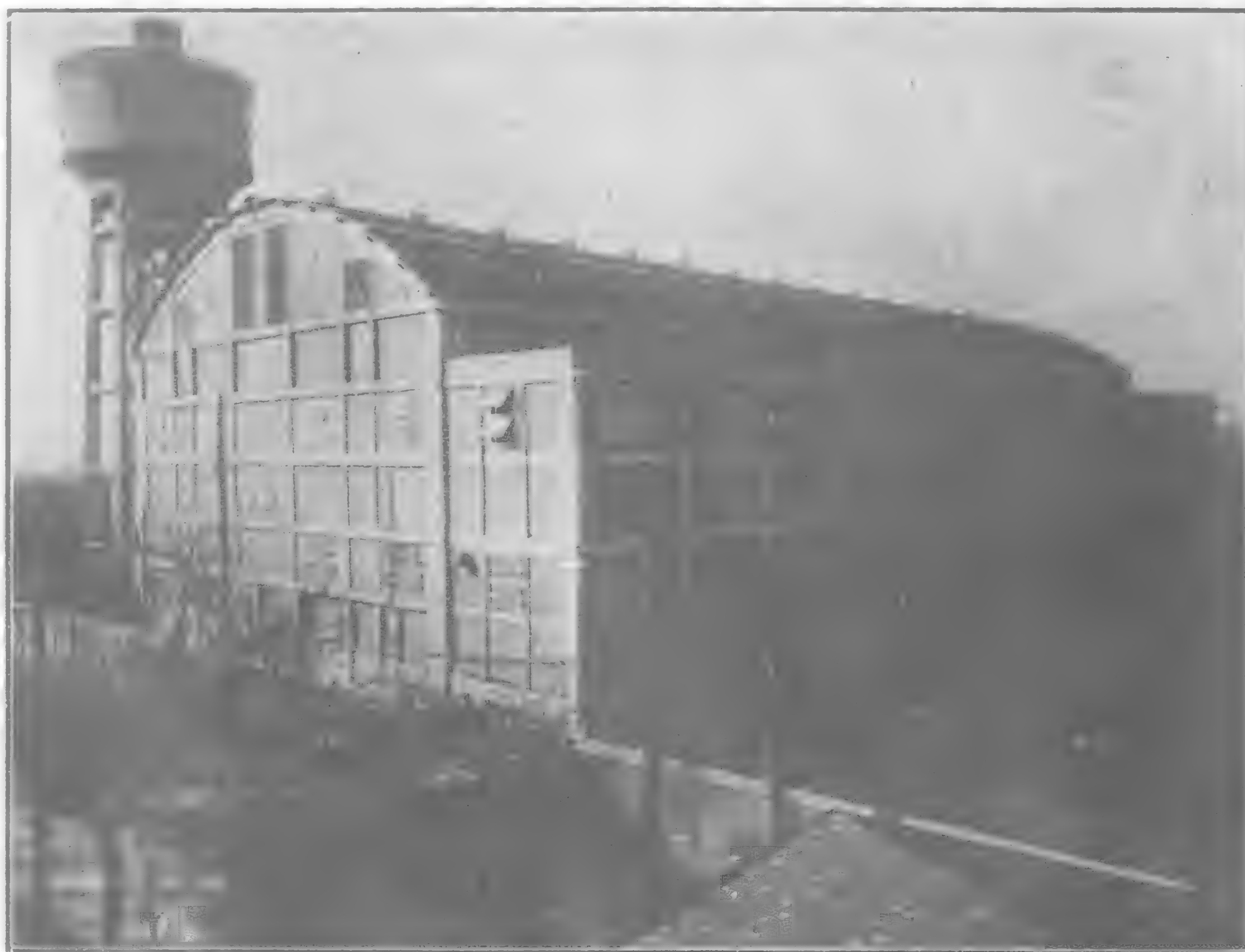
The previous sets installed are two sets of 1,200 k.v.a. Sulzer-Diesel motors and Oerlikon alternators and two sets of 3,300 k.v.a. with Sulzer-Diesel motors and Schneider alternators. Since the installation last month, there will be room for only one more generating unit of the same size as the present one, and from this building of 16,000 k.v.a., the plant must then expand on additional ground which already has been made available.

The foundations for the sixth set of engines already have been laid in a space next the latest installation.

For purposes of comparison with the



The Newest Sulzer-Diesel Motor, Driving an Oerlikan Alternator, and Supplying 3,600 k.v.a.



The Lokawei Plant of the French Tramway and Electric Light Company in Shanghai, now Claimed to be the Largest Diesel Electric Generating Plant in the World

present set, we give a few details of the engines previously installed. The Diesel engines for driving the 1,200 k.v.a. sets are of four-cylinder type, running at 150 r.p.m. Those for the medium powered sets of 3,300 k.v.a. are all of six cylinders at 125 r.p.m. All work

permits of a power theoretically double that of a four-stroke cycle of the same cylinder capacity.

The Oerlikon fly-wheel alternators on the smallest sets are of 5,500 volts, of a frequency of 50 periods, directly mounted on the shaft at a speed of 125 r.p.m. For the 3,300 k.v.a. sets the Schneider alternators are of like capacity, frequency and position. At the end of the engine-room opposite the latest set, is a sub-station comprising three rotary-converters by Schneider and Company, each of 350 kilowatts converting to continuous current the equivalent of about 1,500 h.p. for use by the tramways. A fourth converter is to be added.

The circulation of the water, which passes through a system of cooling refrigerators in a closed circuit, and the supply of fuel from six underground concrete reservoirs of 1,100 cubic meters each, are effected, by Sulzer centrifugal pumps installed in the basement of the power station, where are also the foundations of the motors. These two first generating sets of 1,200 k.v.a. were installed in November, 1922, the first 3,300 k.v.a. set in October, 1924, and the other in December, 1925.

No date has been set for the expansion of the plant to its sixth unit, but this is bound to take place within the next year.

Presidency of the League Council

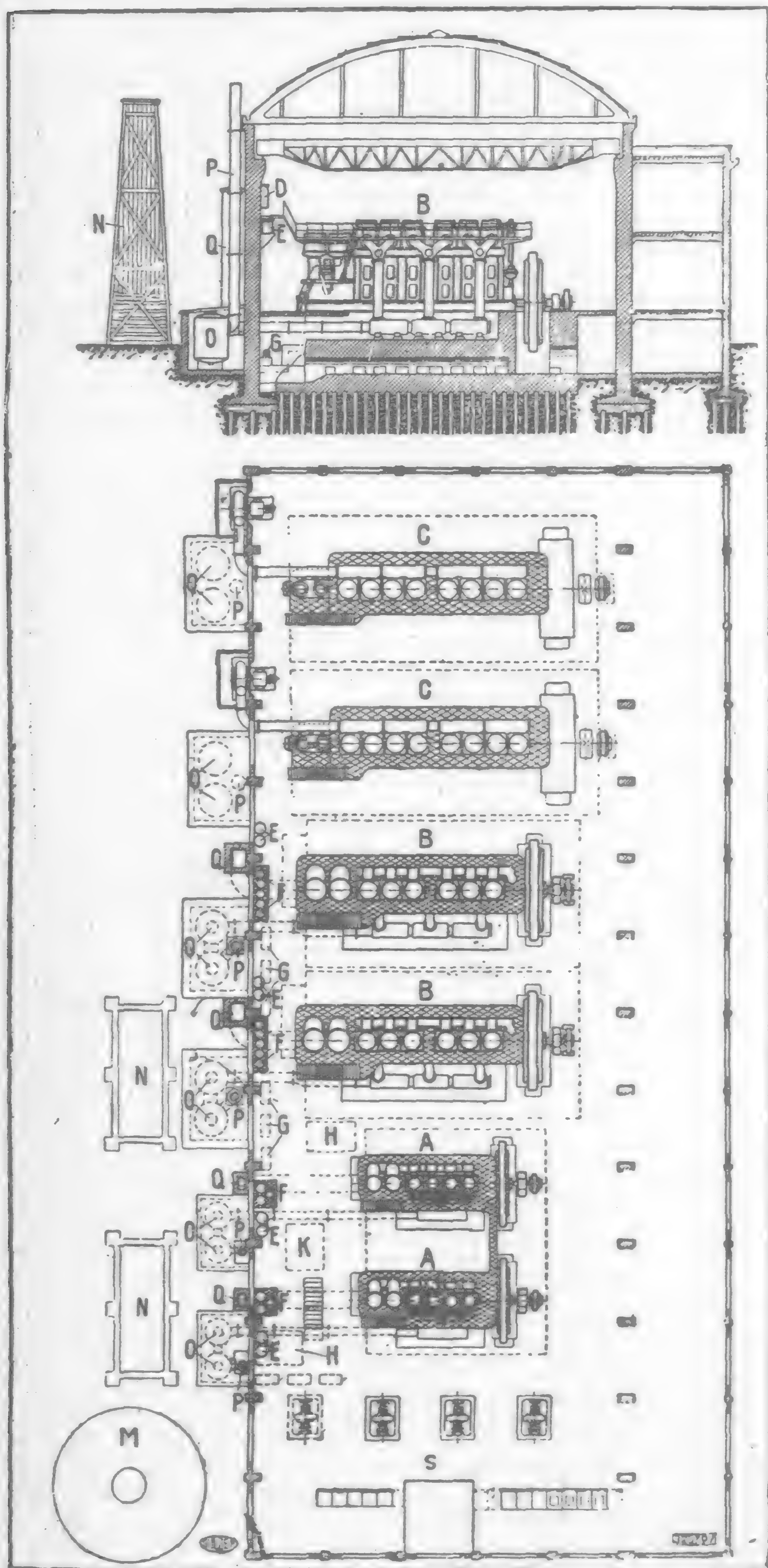
DR WELLINGTON KOO, the experienced diplomat of the Peking Government, has been appointed Minister to Belgium.

Why he should accept such a secondary job after having filled the most important positions in his government, was somewhat of a mystery. The secret is now out. The Chinese Delegate to the League of Nations has the right this coming session to occupy the position of presiding officer under the rule that provides for ascendancy by alphabetical order. China's right to preside over the Council came up at the September session, but Wang Ting-chun, Chinese Minister to Lisbon, appointed by Chang Tso-lin to represent his government at Geneva was unable because of financial difficulties to incur the heavy entertainment expenses incidental to the position. Never having been in Geneva before and unable to cope with the League problems he made a gracious speech to the Council and waived his rights, thus permitting the Chilean delegate to take the council Chair and become temporary President of the eighth League Assembly. When this news reached Peking, Chang Tso-lin fell into a rage, dismissed the envoy to Portugal and cut him off the payroll.

The League was recently notified that Tcheng-loh, Chinese Minister to Paris, is the nominee of his government for the presidency of the 48th session of the League Council, set for December 5, Tcheng, having been provided with funds to maintain lavishly his position, has reserved a suite in one of the most expensive hotels of Geneva and is ready to take over the job of supreme head of the League. Although unversed in the intricacies of the League's problems or its affairs, the Chinese Government considers that its Minister to Paris is perfectly qualified to act as the presiding officer and cross swords with such able parliamentary strategists as the delegates of the great European Powers. In the meantime, Wellington Koo is hurrying to Brussels and there is just the possibility that when he arrives in Europe, Tcheng-loh will be superseded, by a diplomat whose handling of China's problems when he formerly represented his country in the League, won for him a high place in international affairs.

A flood of protests is pouring into the League Secretariat against China's being conceded this high distinction, but there seems no way to escape the rule that was laid down, except by a majority vote and this will precipitate a fight which will seriously impair the prestige of the League. Chang Tso-lin represents the *de-facto* government of China and the elevation of his delegate to the presidency of the League automatically recognizes his government at a time when he is denounced as a bandit and militarist by a large section of China. The League is placed in an unpleasant dilemma.

Its recognition of Chang's representative will give the Peking government additional prestige and embitter the Southern leaders. On the other hand, such recognition of Chang by the League, would be the logical answer of the great Powers to the Soviet influence which has made itself felt so strongly in the anti-foreign attitude of the Kuomintang faction.



Transverse section and plan of the new power station at Shanghai, installation of Sulzer-Diesel motors

- | | |
|--|--|
| A, 1,200 kilovolt-ampere sets; | K, tank for hot water; |
| B, 3,300 kilovolt-ampere sets; | M, water-tower of 400 cubic meters capacity; |
| C, 4,600 kilovolt-ampere sets; | N, cooling towers of 200 cubic meters capacity each; |
| D, fuel reservoir; | O, silencers; |
| E, fuel receptacle; | P, exhaust pipes; |
| F, compressed-air bottles; | Q, scavenging air inlet; |
| G, sets of electric motor-driven pumps; | S, rotary-transformer substation. |
| H, tank for receiving the overflow water used for cooling the pistons; | |

on the two-cycle system and are equipped with scavenging and supplementary air admission ports, characteristic of this type of Sulzer-Diesel motor. The use of a two-cycle motor with the advantageous design of cylinder-head having one central valve-hole

The Valuation of a Public Utility

By H. O. Kung, Inspection and Testing Department, Westinghouse Electric & Mfg, Co., U.S.A.

THE problem of valuation has confronted with more difficulties in the Tientsin Electric Light and Street Railway Case. According to the general contract, Article 14, the Chihli Government may purchase the properties of the operating company after the first twenty years of service at a price which shall be fifteen times the average annual profit of the immediate three preceding years and shall in no case be less than all the expenses for construction and installation of the entire plant buildings, trolleys and tracks, machinery and equipment, etc. of the company. It is also stated that should the Chihli Government not purchase the properties of the operating company at the end of the first twenty years service a seven years extension service shall be allowed to the same company, and so forth. By Article 15, however, after fifty years of service all the properties, including lands, railways, buildings, machinery, materials, etc. shall be transferred without any compensation or obligation to the Chihli Government and all these properties must be in good working condition at the time of delivery.

These arrangements are fundamentally in conflict when we compare the cost to the Chihli Government in obtaining the property of the company at the end of their franchise, that is to say after fifty years, and the cost to the Government at the seventh elapse period, i.e. after forty-nine years. The general contract was signed on April 26, 1904, and the franchise for furnishing electric light and street car services will be legally terminated in 1954 and the seventh elapse period would be in 1953. The annual profit for 1924 was \$1,854,159. Assuming now the average annual profit to the company preceding the seventh elapse period be \$5,000,000. Then, as formulated on the contract, it would cost the Chihli Government \$75,000,000 to acquire the Company's property. However, just wait for another year, i.e. until 1954, the Chihli Government might obtain the entire property of the company without any compensation or obligation. It is obvious that if the "fifteen times yearly profit" and the "transfer of property to the Government without cost" provisions were legally correct they would be quite absurd when we look at the assumption from the valuation engineering viewpoint.

The company would naturally prefer the "fifteen times yearly profit" clause to be held still effective while the Chihli Government would no doubt be looking for some illegal profits which might have been earned during the preceding twenty-three years. It has been provided by Article 20 of the general contract that the Chihli Government may acquire the control of the company's property if it can be shown that the company has earned any illegal compensation. In a note sent to the Government the company claimed \$26,305,395 as the purchase price of the company's property and yet the gross revenue from electric lighting for that year was not added to the said amount. As a result of several months of detective investigation conducted by a special committee appointed by the Chihli Government the operating company has been blamed as having taken some illegal profits. Based upon the general contract, Article 20, the Government acquired the control of the property in August, 1927. There has, probably, been a deadlock in this case.

As the valuation engineering of a public utility is still in

its infancy in the Orient it is the intention of the writer to outline the various methods for dealing with such a problem.

There are five general methods which have been used in public utility valuation. The first one as well as the oldest is called the original cost method and is based upon the original investment of the company at the beginning of their operation. The advantages in using this method are its simplicity and ready application; but in many cases either the original records are lost or the present day values would not be accord with the original cost due to the fact that the trend of the material cost has been upward. Applying this method of valuation, therefore, would easily lead to either undervaluation or overvaluation as compared with its true present market value, for no property can remain at the same numerical market value for a number of years.

The second method of valuation to be considered is the historical cost method. By the historical cost we mean that all the capital transactions including additions or betterment and subtractions or withdrawal of investment, must be taken into consideration. A company, for example, had an original capital of \$10,000,000 and five years afterwards had an increase in capital of \$1,000,000 for certain new construction and at the end of eight years a withdrawal of \$100,000 capital on account of excessive capitalization. Applying the historical cost method of valuation the concern would be valued as \$10,000,000 plus \$1,000,000, then minus \$100,000 or \$10,900,000. This method will give a closer valuation to its present market value but disadvantages still exist owing to the fluctuation of market prices.

Valuation of a property by comparing it with a similar property having its valuation already known to the appraiser may be considered as the third method of valuation. For instance, the Peking Street Railway Company having a total mileage of about 30 miles of track, has an aggregated capital investment of about \$5,000,000, then, 25 miles of street railway in the City of Tientsin would probably absorb an investment in the neighborhood of \$4,000,000. This method of valuation will give a fairly approximate figure for the valuation of a public utility provided the features involved in the concerns compared are substantially similar and equitable. Except for extraordinary reasons, this method should not be used in actual valuation cases for a small percentage of error in comparison would lead to an appreciable mistake. However, for an engineering estimation the comparison method of valuation has frequently been adopted on account of its labor saving in detailed calculation.

The fourth valuation method is called the inventory methods. An inventory must be taken in each case and to this is assigned the present day valuation on each of the listed articles, such lands, buildings, machinery, equipment, etc. In most cases a fair valuation may be thus obtained but the time taken in making up a complete inventory and an appraisal which is fair to both the seller and the buyer is a very long even for a medium size concern and the expenses for hiring experts in the appraisal amount to a large bulk sum.

From the foregoing discussion it will be readily seen that for every advantage of the previous methods there is an accompanying disadvantage. In endeavoring to avoid the disadvantages the so-called reproduction new cost



Inauguration of the Tientsin Tramway Co.

method has been developed. Mr. W. H. Maltbie of Baltimore, Maryland, gave the following definition:

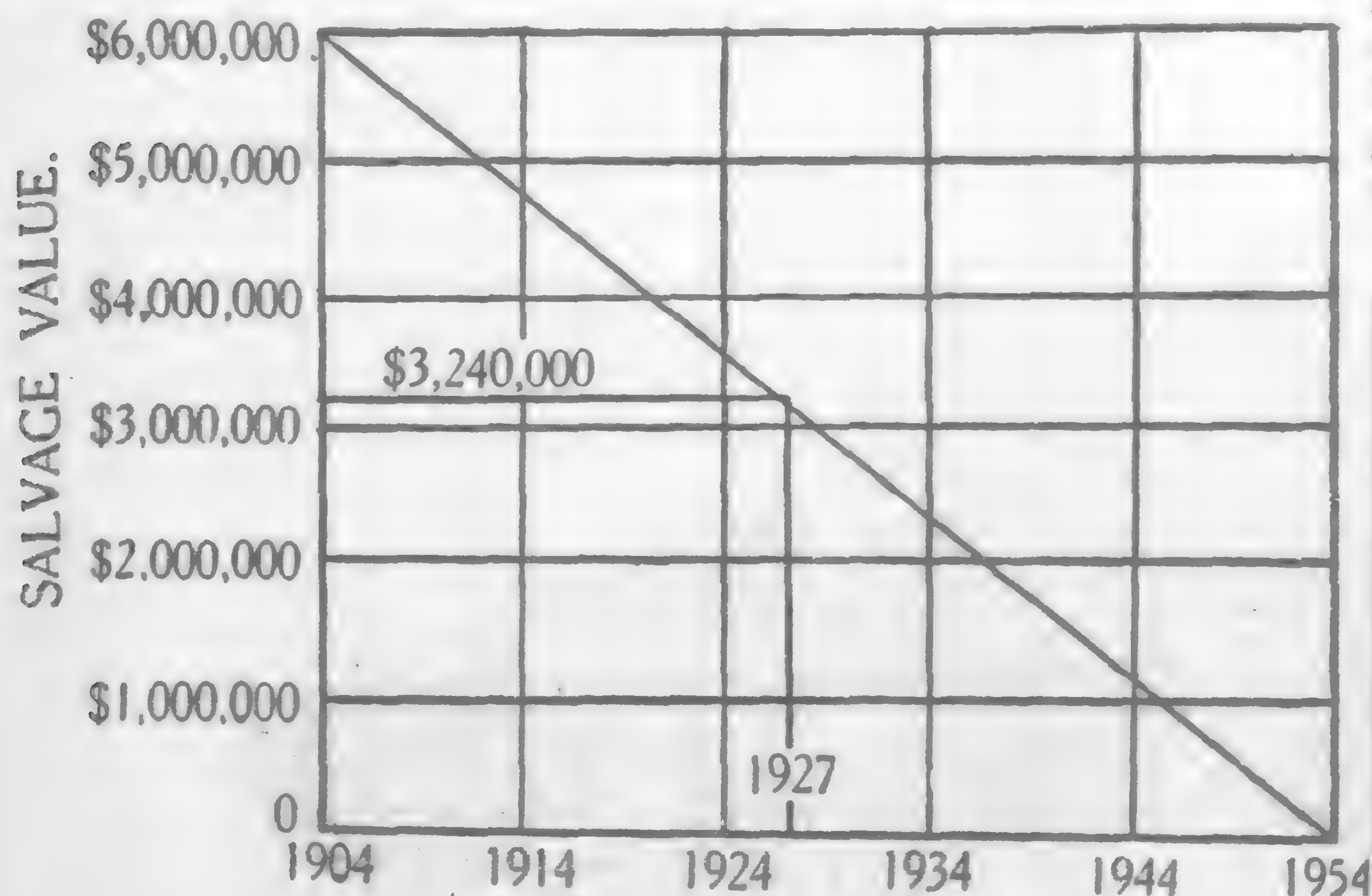
"Cost to reproduce new is the actual amount necessary to be expended in order to reproduce the present plant at present day prices under the original physical conditions."

In making the definition still clearer Mr. Maltbie added (1) that the cost to reproduce new is not the cost of a different plant capable of equivalent service, but of the existing plant; (2) that the cost to reproduce new is not the cost of the present plant at original prices, at prices of any prior date, or at average prices over any prior period, but at present prices; and (3) that the cost to reproduce new is not the cost under present physical conditions, but under those existing at the time the plant was created.

Nevertheless the reproduction new cost method has many economical merits and the legal soundness is vouched by its development and adoption by leading valuation engineers and the courts of the United States of America. In practical application, however, this method is rather a difficult one because it needs widely experienced engineers and speciality experts for its application.

It is the opinion of the writer that for the Tientsin Electric Light and Street Railway case the valuation of the Company's properties should not be determined in accordance with any single method as listed in the foregoing discussion nor should it be determined according to the contract. In fact, to determine the value of such a twenty three years old public utility is a difficult task because its original cost is unknown to the Chihli Government and no detailed financial statement has ever been submitted to the Government. To illustrate the faultiness of the contract on valuation clauses and for the sake of simplicity the straight line depreciation method may be applied to this case. It is stated in Article 15 of the general contract that all the properties of the operating company shall be transferred to the Chihli Government without any compensation after fifty years of service and all the properties shall be kept in good workable condition. In other words, the salvage value of the properties by the company at the year 1954 would be equal zero. Or we may say the life of the property is fifty years and no salvage value at the end of its life. Assuming the original capital investment was \$6,000,000. Then based on the straight line depreciation principle the annual depreciation as distributed over fifty years would be \$120,000. Since the plant has already been in service for 23 years, the total depreciation for this period of time would be 23 by \$120,000, or \$2,760,000. Consequently the salvage value at the present time would be \$6,000,000 minus \$2,760,000 or \$3,240,000. This is also illustrated by the accompanying diagram.

In the opinion of the writer, both Articles 14 and 15 of the general contract should not be held as effective in the present valuation case. Because one is in conflict with the other. If the company would firmly hold the fifteen times yearly profit clause in Article 14 of the contract to be effective then the Chihli Government might hold the fifty years clause as its useful life and demand the application of a depreciation method for its present salvage value. In the former case, the Chihli Government would pay much more



money than its actual worth in acquiring the company's property while with the later case the company would lose a great deal of their original investment. It is reasonable that neither of these two provisions in the contract should be held effective.

It should be remembered that in any valuation case depreciation plays a very important part. Whether the accrued depreciation should be deducted from the valuation of a public utility is still a question. Any contract value of the company, such as coal supply contract at a lower price per ton of coal than the present open market coal price, should be considered as part of their valuation. But good will and going value should be disregarded because the company has enjoyed a monopoly for their service and is old enough to have offset their deficit during earlier years.

The purchasing price of the properties of the Tientsin Electric Light and Street Railway Company should be just, reasonable and equitable for both the company and the Government. To arrive at such a reasonable valuation the following three elements should be considered carefully and should be given their proper relative weights in determining their final price. First, the actual original and historical investment of the company should be disclosed to the appraisal engineer. Second, the market value and the total outstanding of their stocks and bonds of the company at the present time should also be disclosed. Third, a brief but complete financial statement of the company for each year from the beginning up to the present, or the past ten years should be presented to the appraisal engineer. Based upon these three elements and applying the equal profit ratio depreciation method a fair and just valuation of the company's properties may be worked out by appraisal engineers. By such a valuation the Government will be guarded from unreasonable payment in excess of the true value and the company will be saved from enormous expenses legal holding of the fifteen times yearly profit to be effective.

The equal profit ratio depreciation method was developed by Prof. John C. L. Fish of Stanford University and is best explained by his own words: "A fair price for a second-hand structure is such as will cause the ratios of equivalent uniform yearly profit to investment to be the same for the seller as for the buyer." The equal profit ratio method will enable the Chihli Government to make the same percentage of profit as the former operating company had been making.

Chinese Launch with British Engines

It would appear that, in spite of political troubles in China, there is still a demand for motor craft.

In the early part of the year we reported that the Parsons Oil Engine Co. had received instructions to supply two standard 28-32 h.p. paraffin engines for Shanghai, and an illustration is now given of the boat in which these motors were installed. She is the "Wayfoong," and is 57 ft. long with a beam of 11 ft. 6 ins. The speed attained is between 9 knots and 10 knots. As will be gathered from the illustration, she is provided with a substantial amount of accommodation for passengers.



The "Wayfoong"

Out of Kimono into Overall

The Industrial Transition in Japan

By Maurice Holland, Director, Division of Engineering and Industrial Research, National Research Council

A Report of Investigations Conducted in Connection with the Third Pan-Pacific Science Congress, Tokyo, October-November, 1926

(Continued from our December issue).

One of the most remarkable tributes to Japanese efficiency from a highly-qualified and expert investigator, specially delegated for this difficult task, is given in the following Report to the National Research Council, by Mr. Maurice Holland, Director of its Engineering and Industrial Research Division. No longer is Japan dependent upon an imported technology. Thirty thousand engineers are enrolled in the membership of her national engineering societies. Ninety research institutions are listed by the Department of Commerce and Industry all conducting laboratories and contributing their knowledge in the race for economic supremacy. In the same way that Japan set out to learn and master Western methods of defense, which has preserved intact her independence and carried her in fifty years to the third rank in military and naval power, so she is determined to leave no stone unturned to learn the secrets of our economic supremacy. It is hard going to change from kimono into overalls in two generations. It is difficult to transform the old Japanese artisan into a modern mechanic, able to compete with nations which have an advantage of a century of industrial training and traditions. But Japan is doing it. The Ministry of Commerce has planned the use of Yen 45,000,000 over a period of years to encourage certain key industries and the bulk of this subsidy will be expended in the engineering trades. That Japan now occupies third place in the organization of industrial research amongst the nations of the world, being surpassed only by Germany and the United States, will come as a surprise to those who refuse to believe in her progress.

The Aeronautical Industry

Bureau of Civil Aviation: The Bureau of Civil Aviation of the Department of Communications is charged with administrative and legal control of all civilian flying in Japan. Air legislation, licensing and inspection of aircraft and pilots, establishing airways and landing fields, and the determination of an equitable subsidy plan by which the government may encourage the operating companies to extend present airlines and establish new ones, constitute its major functions.

Civil aviation and air transport up to the present time have been developed only to a limited extent. There are but four regular airlines in operation at present. A projected line between Osaka-Fukuoka and Dairen in Korea is being operated on an experimental basis by the Kawanishi Company in Kobe, one of the pioneer aircraft companies, and the only one exclusively commercial. This company is engaged in both manufacture and operation of aircraft. Its organization, operations, and equipment will be described in detail later.

Of the four regular services at present in operation the first operates to the north from Tokyo to Sendai once a week. This line



The Machines Employed in the "Asahi" Tokyo-Europe Flight are Two Breguets, Capable of An Average Speed of 180 Kilometers An Hour

carries mail principally and uses land type planes—converted army equipment. The second line operates between Osaka-Takamatsu-Imaharu-Oiita—three trips a week and uses seaplanes. The third operates between Osaka-Fukuoka, also three trips weekly, using seaplanes. The fourth line connecting the two most important commercial and industrial cities in Japan, Tokyo and Osaka, operates on a schedule of three trips a week, using land type planes. This line having the heaviest traffic will increase its service in the near future.

In the opinion of the officials of the Bureau the limited development of civil aviation in Japan may be attributed to the following reasons, in the order of their importance. First, the initial attempts to operate commercial lines were made with converted military and naval aircraft, which are wholly unsuited to the purpose, and made profitable operation impossible. It has taken five years to use up the surplus war material and only now has sufficient economic pressure developed to encourage manufacturers to undertake the design and construction of a purely commercial type plane with any hope of sufficient volume of sales to pay development costs. Second, the general topography of the main as well as many of the smaller islands, consisting almost wholly of mountainous country and rice fields, is a serious handicap to safe and regular operation, except with water type equipment. Third, distances between important commercial and industrial centers on the main island of Honju are so short that to compete with the present modes of transportation, particularly Government operated railways restricts the margin of profit within small limits. It was frankly admitted that the hopes of future development lay almost entirely in communication and transport between the main island, namely, Honju, and the other principal islands in the group, Formosa, Kuyshu, Shikoku, Hokkaido, Saghalien, and Korea. An additional and equally important reason contributed by the officials of the Imperial Flying Association is that the people of Japan as a whole, and especially the commercial and financial executives, are not "sold" on the economic utility of air transport.

The Imperial Government, realizing the importance and value of providing the initial impetus and encouragement to the industry, and anxious to avoid the mistakes made abroad recently, passed an appropriation of 12,000 yen for the purpose of making a comprehensive survey of the present situation in civil aviation at home and abroad. The Bureau of Civil Aviation is to work out a plan of government subsidy for commercial operating companies and to formulate a national air policy to establish civil aviation on a firm foundation.

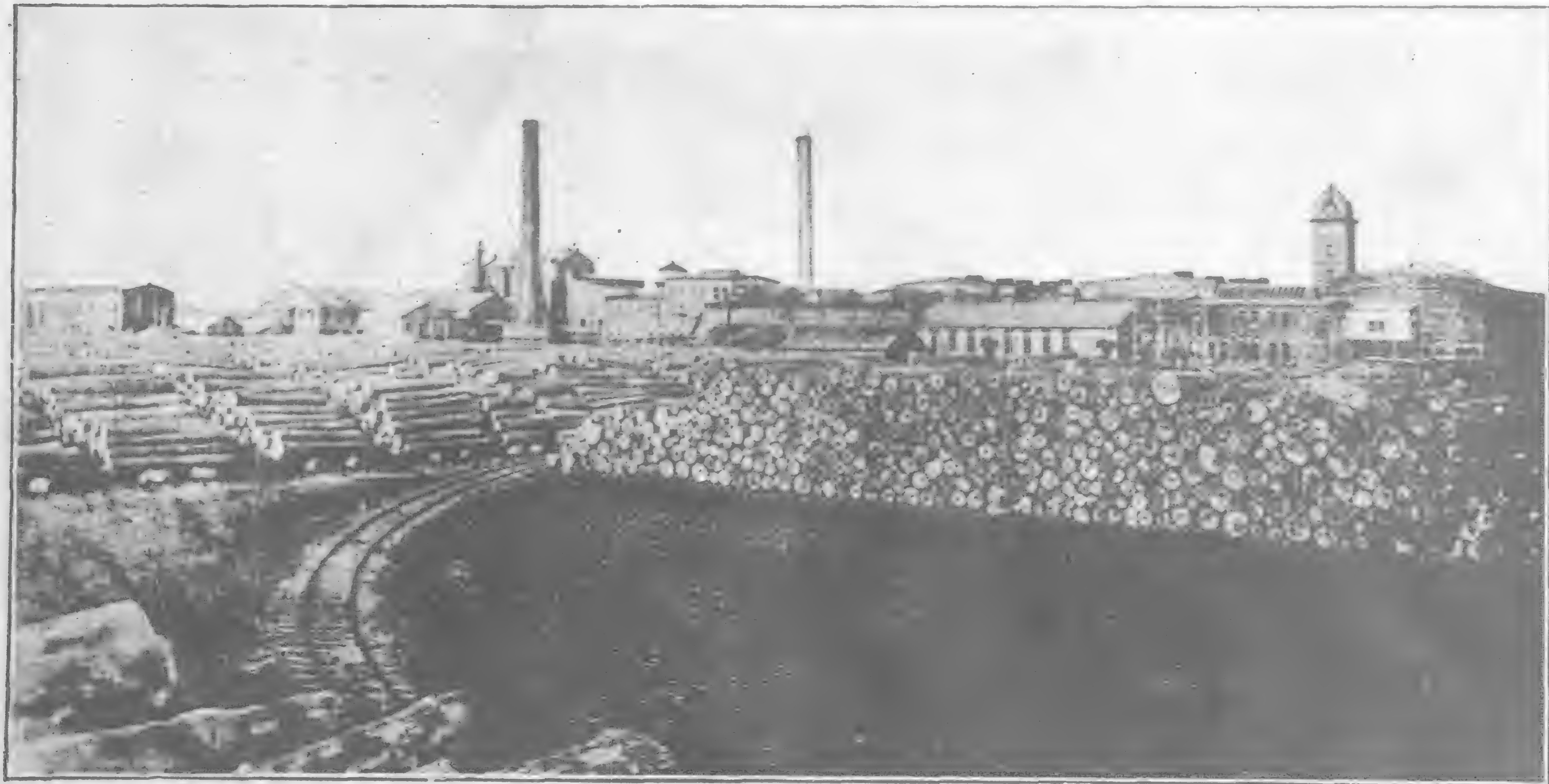
There are at present six aircraft manufacturing concerns in Japan. Listed in the order of their importance and capacity, they

are The Mitsubishi Aircraft and Engine Company, Nagoya, the Aichi Clock Company, in the same city, the Kawasaki Shipyard, specializing in all metal planes, the Nakajima Airplane Manufacturing Company at Ota, the Ishikawajima Dock Yard at Tokyo, and the Kawanishi Company at Kobe.

In order to assure a supply of trained pilots for commercial aviation enterprises the Bureau of Civil Aviation places four young men in training in the Army Aviation School where they undergo a nine months' course of ground and flying instruction before being graduated as qualified pilots. Similarly four men are trained each year on water type planes. Candidates for training must be graduates of the Middle School.

The last budget submitted to the House of Parliament by the Bureau of Civil Aviation recommended an annual appropriation for subsidy to commercial operating companies of Y.160,000, roughly \$80,000, with an additional item of 12,000 for the expenses of a commission to make a general survey of the present status of civil aviation and a detailed study of subsidy plans by which the Government can stimulate progress in the field.

Kawanishi Aircraft Company—Kobe: This aircraft manufacturing company as previously referred to is one of the oldest in Japan, being one of the first to make sport type planes, and is exclusively devoted to commercial aircraft manufacture and operation of air lines. The Kawanishi Company proper is a large manufacturer of scales, spring balances and other products with aircraft as a side line, a hobby of the owner. The factory is small having a force of nine engineers and about eighty men. The company owns or leases an aerodrome, at Osaka, the center of its airline operations. This company is the only private concern in the aircraft industry which has a research laboratory. A Gottingen type wind channel constructed entirely of concrete is well along in the progress of construction. Mr. Ono, a staff engineer of the Company and a graduate of the Aeronautical Engineering Course at the Imperial University of Tokyo under Baron Shiba, is at present in charge of engineering and design. Upon the completion of the wind channel which is housed in a separate building, research work as a basis for design development, particularly of commercial types, will be undertaken under the direction of Mr. Ono who will become the Director of Research. During the construction of the wind channel and until it is operating under service conditions, a German engineer (Erik Kayser) from the University of Stuttgart is acting in advisory capacity. The channel is of the return type, two meters in diameter, air speed of fifty meters per second and represents an expenditure of Y.100,000, about \$50,000. The balance is one of a new type developed at Stuttgart, there being only one other of its type



Oji Paper Mill

installed in Europe at Freidrickshaffen. A novel device for use in wind channel test is a special motor generator set which has been constructed to drive model propellers at service speed on model planes being tested. Mr. Kayser asserted that this new device would increase the accuracy of the determination of aerodynamic co-efficients and reduce the difference caused by scale effect in present methods.

The present model type 10, which is to be the equipment for the proposed air line between Osaka and Darien in Korea, is the result of evolution and experience accumulated in building nine previous models during the last eight years. The design is conventional cabin bi-plane seating four people and fitted with 450 Hispano engine. The usual load carried is 3,000 pounds. In design this model has no distinctive features.

Considerable success was attained with the previous model, i.e. type 9; a cantilever monoplane, interchangeable land or water type, is at present being used on the airlines in regular operation Osaka-Tokyo-Sandai and Osada to Fukuoka, carrying mail only under government subsidy at 15 sen a pound. The introduction of wing flaps at 25 per cent. of the cord from the trailing edge has increased the load this model will lift off the water by 25 per cent. and reduce the landing speed by about 20 per cent. This type is fitted with a Mayback engine which, although it is realized is heavy in weight, is comparatively economical, but its principal advantage

tion Manager, he admitted that civil aviation progress has been slow, in fact only within the last year has real interest and activity in the Association program been developed. Captain Uno attributed the lack of general interest and slow progress in civil aviation to: the lack of co-operation, amounting to passive resistance, on the part of Military and Naval Air Services; the necessity for using obsolete army and navy equipment wholly unsuited in design and economy of operation in civil aviation enterprises, this factor alone having delayed progress at least five years; the business men of Japan in general not being "sold" on aviation. Additional reasons more directly concerned with actual operations included such inherent difficulties as the short distances between important industrial and commercial centers, making competition with efficiently operated Government railways impractical and uneconomic. The high cost of land close to centers of population forces the location of aerodromes to places in the outskirts of cities, and high terminal losses are inevitable. As a final clinching argument there has been no incentive up to date for the industry to develop a purely commercial type plane. Some encouragement for the general situation is found in the apparent awakening of government officials to the importance and value of civil aviation and the consequent appropriation of Y.12,000 for expenses of a Commission to study the general situation and recommend an equitable subsidy plan to encourage manufacturers or operators to enter the commercial field. It is



Nippon Electric Works

is its reliability and safety for commercial operation. This company is considered by aviation officials in Japan to have the most promise for success in commercial manufacture and operation of any company operating at present.

Imperial Flying Association: The Imperial Flying Association, of which Lieutenant General Nagaoka (retired) is in active charge, is one of the largest, most representative, and influential organizations in civil aviation in Japan. The Association is not primarily made up of flying personnel or those actively engaged in the manufacture or operation of aircraft, but rather of men of commerce, industry, and finance, ex-army and navy men; in fact, anyone interested in the promotion of civil aeronautics may become a member upon payment of a subscription of Y.2. Subscriptions and donations totalling something over Y.1,000,000 have been received since its establishment ten years ago. The funds raised have been expended largely on propaganda work, that is, the distribution of literature designed to stimulate public interest in aviation, the posting of cash prizes for aviation contests, staging aerial shows and demonstrations, and publishing a Journal of the Association devoted to aviation subjects. The membership of the Association, numbering about 30,000 is distributed over the whole of Japan. Organization of local chapters is in progress at the present time.

In discussing the general civil aviation situation in Japan with Captain Uno, a Naval Reserve Officer who is acting as Associa-

interesting to note that from a consensus of the views expressed by officials of the Bureau of Civil Aviation, aircraft manufacturers and the Flying Association, which represents the layman's view, all parties have diagnosed the case along identically the same lines and moreover they are universal in prescribing the form of remedy. Succinctly stated the remedy takes this composite form: Direct government subsidy to operating companies, the development of equipment specifically designed for commercial flying, and the establishment of the main arteries of airway traffic in a correlated system of inter-island lines centering in the main Island of Honju and radiating out to all the other islands of the group to Korea.

The Silk Industry

The Imperial Japanese Sericultural Experiment Station: The Imperial Japanese Sericultural Experiment Station is the centralized research agency for the sericulture industry of Japan. Beginning with the breeding of pure races of silk worms, the investigations of this Institute are divided into departments of mulberry trees, biology, pathology, filature, and chemistry. There are six branch stations operated in various parts of the silk producing regions of Japan in connection with this centralized organization, and the total budget of the Institute is around \$195,000,000.

The stated purpose of the Experimental Station is to improve the races of silk worms, to facilitate their distribution and to promote scientific processes of sericulture among the rural population. The first generation of hybrid silk worm eggs is distributed free of charge among the farmers. Special lectures by experts on the processes of reeling and spinning silk are given from time to time in the centers of the industry. A complete list of the reports of investigations conducted by this station, which range from the chemical composition of mulberry leaves to a study of the parasites of silk worms, also investigations concerning the technology of raw silk manufacture, and methods of testing and classifying cocoons through to the actual silk manufacturing methods used in industry, is attached as an appendix to this report. Nearly 70,000 silk worm egg cards are distributed annually by this Institution. Another important phase of the Institute's work is the training of filature instructors. Courses of training lasting five months are given, to which 25 male and 70 female attendants are admitted each year. Some 1,200 persons have completed the course. Short term lectures are also given on the cultivation of mulberry trees and the rearing of silk worms. Four hundred and seventy-six people have obtained certificates of graduation in this course. The chemical analysis section of the Institute is open to the public, and between 1920-1925, some 200 odd analyses have been made of mulberry trees, cocoons, raw silk, and water used for spinning cocoons.

The Institute is housed in modern laboratory buildings with extensive units for carrying out semi-commercial scale experiments. An important feature of the Institute is an extensive museum covering the development of the raw silk industry in detail, both in Japan and abroad.

The Katakura Silk Thread Company: In an attempt to trace the influence of pure science research on industrial technology in a representative silk mill, the Katakura Silk Thread Company at Onmya was visited. This silk company is one of the few, if not the only manufacturing company, which supports a research laboratory. The plant is located in the Shinshu district, one of the most famous in the raw silk industry of Japan. Silk reeling in Shinshu is the most important industry of the district which forms the center of that industry in the whole Empire. Fifty-one per cent. of the raw silk exported by Japan is Shinshu.

Through close co-operation with the buyers of raw silk in America, the establishment of standards and specifications, frequent visits of exchange committees, the process technology of raw silk produced by the Katakura and other associated companies has reached a high state of development.

The plant itself is somewhat of a model, although the processes, aside from the experimental section, are of conventional silk thread mill type. In the experimental section, various types of improved or modified reeling machines imported from Italy and other countries are being tested. An Italian direct-reeling machine under test at the present time, while showing slightly lower production capacity, produces a silk filature which is hard and dry and better lustre than the silk produced by re-reeling methods now used generally throughout the factories of Japan. The unit production of the operator on the Italian type machine is 100 mummies compared with 120 mummies under the conventional system.

No improvement in the sunken methods of reeling silk has been developed. The average production of one operator is the reeling of 120 mummies of silk a day; the average rate of pay is 76 sen per day, equivalent to about 38 cents; girl operators are employed exclusively. In silk mills, as in other industries in Japan, particularly outside the centers of population, the employees work seven days a week straight through, with two days off a month. In this plant some 700 girls are housed in company dormitories. Extensive welfare facilities are available to the employees of this company. In the inspection unit of the experimental section, silk is examined for

color and luster under conditions provided for the maximum utilization of north light. Some effort is being made to improve the standards of inspection by artificial daylight means of illumination.

On the whole, there is considerable evidence that the conventional process of manufacture of the silk industry in Japan is thoroughly crystallized and only in rare instances, in the most progressive manufacturing companies in the industry, is an effort being made to improve the technology of processes. The major effort in pure science research is being directed towards increasing the quantity and quality of unit production of silk worms rather than in the actual process of manufacture. The principal emphasis of fundamental research is in the field of agricultural and biological studies affecting the silk worm and feeding. The managing-director of this plant pointed out that there was considerable opportunity for the development of automatic machinery to replace the hand operations which are so extensively used in Japan at present, simply because of cheap labor.

Representative Research Laboratories

The National Institute of Physical and Chemical Research: The National Institute of Physical and Chemical Research is by far the most important, largest, and best equipped research institute in Japan. The Institute, founded in 1917 with a total fund of about three and a half million dollars, compares favourably in housing, equipment, organization, with the foremost research organizations in the world, such as the Bureau of Standards, the National Physical Laboratory in England and the Kaiser Wilhelm Institute in Germany. Of the 300 personnel of this organization, 112 are actual research workers. Built at a cost of one and a half million dollars, some 13 laboratory buildings are occupied by departments of chemistry, physics, optics, electrotechnics. Several buildings are devoted to industrial research and shops. The annual budget for the Institute is about half a million dollars.

A unique feature in the organization of projects is that 24 laboratories composing the group are known by the names of the chief investigators. Each unit operates on its own budget and is administered by, as well as being in direct technical charge of, the chief investigator. During the year 1926, 171 separate investigations were in progress. A complete descriptive booklet of the Institute, including a detailed list of personnel, floor plans of the Institute, cost of buildings, itemized budget, and a list of reports covering the investigations of the Institute, is attached as an appendix to this report. Only those features of work in progress or equipment of particular interest will be noted here.

Although the Institute is subsidized by the Imperial Government and projects are submitted to the laboratory by the industry, the industry itself is required to pay the actual cost of the investigation or support a fellowship for the specific project of research. When a patentable discovery results from a research investigation, 50 per cent. of the profit realized by industrial application and sale of the product is returned to the Institute, 25 per cent. of which goes to the inventor.

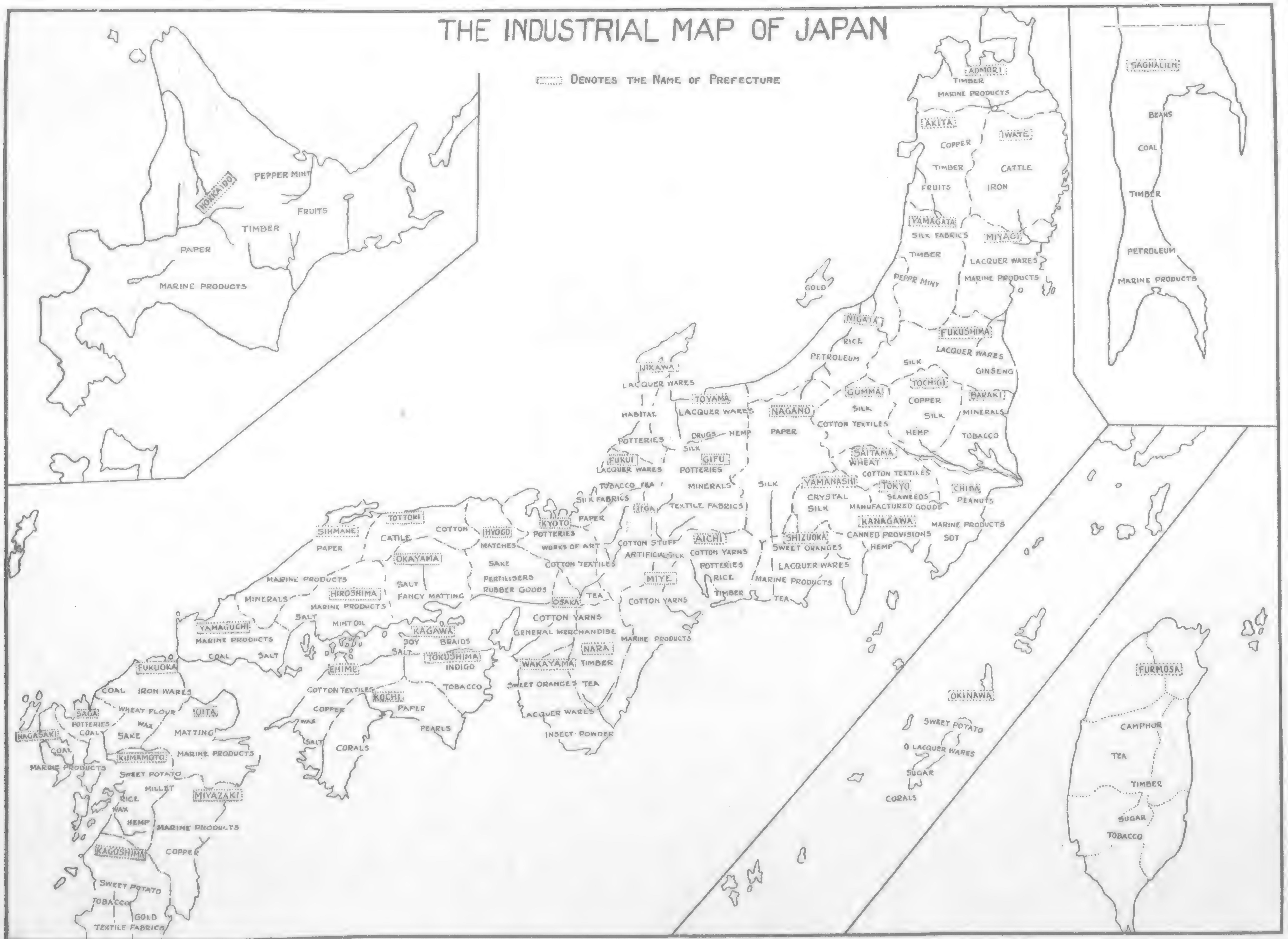
In the laboratory of Professor Nagaoka, one of the most eminent physical chemists in Japan, classical investigations in the structure of matter are in progress, particularly the transmutation of gold from mercury. This laboratory was recently visited by Dr. Fritz Haber, who was the center of interest in this work in Germany. Dr. Haber made studies of the relative progress, methods and apparatus used in the two Institutions. Professor Nagaoka demonstrated a new type of mercury lamp, utilizing silica glass tubing, which has been proven by experiment and test to have a capacity of 500 volts direct current for 2,000 hours. This lamp is being made by the laboratory for commercial sale. The present estimate of the retail price in Japan is roughly \$35.00.



Aeroplanes Made in the Nagoya Works

THE INDUSTRIAL MAP OF JAPAN

Denotes the Name of Prefecture



A few high spots of the more interesting investigations which were in progress included Diesel engine research, in which the cylinder pressures were being measured by Piezo electric effect. In another laboratory apparatus had been devised for measuring forces of machine tools in three directions, by direct electrical measurements. Phenolite, a substance similar to Bakelite, previously mentioned in connection with the aeronautical industry, has been developed by the Institute for use in determining stresses in substances by photo-elasticity methods. By the use of a solution of carbon bisulphide, which is said to have the same stress characteristics as Phendite, stresses set up in quenching and various other heat treating processes and metal working are being accurately determined.

A Bakelite varnish which hardens at 120° temperature and sold to the trade by the Sankyo Company, Tokyo, has found extensive use in the electrical industry in Japan.

Along the lines of applied industrial research, processes have been perfected for the manufacture of a synthetic saki, vinegar and soy bean sauces. The manufacture of vitamin A cod liver capsules has been carried through by the Institute from semi-commercial scale production until it has now reached the point of commercial scale production under the control of the laboratory. Experiments are in progress for extracting the valuable item of diet, vitamin C, from Japan green tea. A synthetic indigo has also been produced by the industrial research laboratories. It is reported to be on a par with the dyes produced by similar processes in Germany. One section of the chemical research laboratory is devoting considerable attention to the development of pure chemical derivatives from human hair. Of some 30-odd derivatives developed to date, one holds promise as a specific cure for tuberculosis. Commercial scale manufacturing processes for the production of frying pans and other kitchen utensils by electrolytic disposition of iron have been successfully developed.

There was unmistakable evidence of a thorough organization of the investigations and a definite procedure through the conventional steps of "test tube" or laboratory research, followed by semi-works scale development of mechanical equipment and finally commercial scale operations adapted to industrial application.

Vicomte Okochi, in discussing the subsidy system of research by the Imperial Government for national institutions, made the statement that if the research investigations now in progress proved as fruitful of commercial results as those which have been recently completed, it would be but a short time before the laboratory would be on a self-sustaining basis and independent of Government subsidy.

Imperial Combustibles Research Laboratory: This is one of the most important and extensive national laboratories supported by the Imperial Government.

On account of the limited coal supply in Japan the principal emphasis of research is towards the economic utilization of coal and its derivatives. As one engineer expressed it, "Japan's limited coal supply makes it imperative for us to develop scientific methods for obtaining every atom of energy from our available supply."

The Institute is divided into several sections, which are specifically charged with determining with great exactness the nature and structure of coal, the development of low temperature carbonizing processes and technology, coal derivatives, the use of brown coal, and the extraction of oil from shale.

One research worker in the Physics Department, Dr. Chiga, a former student of Dr. Cottrell, has succeeded in using the technique of the Cottrell process to produce a reverse phenomenon; that is, instead of precipitating coal by electrical methods, he has devised methods for the separation of coal by passing the granulated dust between two charged poles and effecting a physical separation by electrical means. Although the investigation is purely academic in its present state of development, it has wide possibilities for industrial application. Considerable effort is being expended on improving the fundamental principles underlying low temperature carbonizing of coal. An improved type of low temperature furnace has been developed by the Institute, which is particularly adaptable to type of coal used in industrial plants in Japan. Some effort is being made to produce oxygen and hydrogen as by-products from nitrogen production. The staff of the laboratory, numbering 90, includes 10 engineers, 15 assistants, 40 technicians, and 25 laborers. The annual budget is \$125,000.

Pottery Experimental Station—Kyoto: The Potteries Research Institute or Experimental Station, located at Kyoto, the center of

the artistic industries of Japan, is a national institution supported by the Government and operated in the interest of that industry as a whole.

An extensive museum containing pottery from the pottery industries in all parts of the world, is being constantly used and referred to for design material process technology, and development. The Institute is divided into three general departments: design, materials, and tile and terra cotta developments.

Improved pottery machinery is also tested in commercial scale operation by the laboratory. The developments of the Institute are not patentable and are open to the free use of any concern in the industry. The principal direction of research effort is toward more artistic and original designs in pottery, reduction of material costs, and development of new applications. Extensive studies have been made of products of nature and flowers common in Japan, such as bamboo, cherry, chrysanthemum, and other natural products, as inspiration for new designs. A table lamp, recently exhibited at the Sesqui-Centennial exhibition in America, which was developed by the laboratory, is formed in the design of a miniature bamboo tree, in which the most accurate details of color, form, and texture of the natural plant in the state of nature, is duplicated. The product is artistic, utilitarian, and can be produced at a cost which would make it a commercially attractive product.

The pottery industry of Japan, including the famous Satsuma ware and other branches of the industry of more or less localized character, are at this late date largely in that stage of development where technical perfection is dependent upon trade secrets handed down through families. There is a persistent effort being made by the Government, however, to generate the co-operative spirit in the industries, particularly those of semi-artistic character. The director of the potteries experimental station makes frequent trips abroad to compare the state of the art and investigate new developments in foreign countries.

The Tokyo Industrial Research Institute Laboratory: The Tokyo Industrial Research Institute Laboratory is in fact a national laboratory supported by the Imperial Government and operating in close contact with and in the interest of all industries in Japan.

Shortly after the earthquake which so severely handicapped industrial development in Tokyo, the center of industrial development shifted to Osaka, with the result that a considerable industrial research establishment was organized in that city, under the name of Osaka Industrial Research Laboratory. In order to differentiate between these two, it was necessary to add the prefix "Tokyo" to the name "Industrial Research Institute."

The Tokyo Industrial Research Laboratory is the equivalent of the Bureau of Standards in the United States. The principal effort of research investigations is on the development of process technology and new products rather than standards. The Institute works in very close and intimate co-operation with the industries throughout the Empire.

The Institute is divided into five sections, including chemical analyses; sections dealing with oils, wax, cellulose, wood, pigment, and non-metallic substances; a section for cement, tile, building material; one for coal tar derivatives, dye stuff and their applications in industry; and a fifth being specifically charged with researches in iron and steel, mechanical testing, reinforced concrete structures, and electroplating.

Some idea of the volume of work may be indicated by the fact that 250 major research projects have been completed since the laboratory was established some 25 years ago. Four to five thousand routine chemical analyses are made a year. Two years ago the staff numbered 120 but because of reduced appropriations it has now been cut to 80. These include 20 engineers or research workers, 30 assistants, and 20 technicians, designated as second assistants. The normal procedure of operation of the Institute is for industry to pay a nominal sum just covering the cost of tests or investigation, the building, equipment and maintenance being subsidized by the Imperial Government with an annual budget of \$125,000.

In the oil testing section a number of experiments were in progress for the perfection of methods and devices for the recovery or refinement of used oil; although the product is of different color and of comparatively low market value, there is enough margin in recovery costs to allow the product to compete with new oil. Exhaustive researches have been made, particularly in vegetable oils, on account of the relatively limited supply of mineral oils. Soy bean oil, for example, has been hardened by hydrogenation and used as a base for soap. Herring oil, formerly a waste product, has also been

developed by the same process. A combination of the two substances has been made into a soap which combines the best features of both soy bean and heron oil, and the combination in the form of soap is now finding its way into the commercial market with considerable promise of success. Continuing the basic experiments, in which 30 per cent. coconut oil was added, experiments are now under way to harden or age the soap by artificial means. The commercial product known as "Record" soap, is produced on commercial scale cheaper than with former methods and materials.

A chemically pure substance, known as "Squalene" has been produced from a shark liver oil, and shows great possibilities as a base for transformer oil. Since there are no impurities in the substance, it eliminates the possibility of sludging, which has been the principal difficulty to be overcome in the development of transformer oils.

Researches in the development of this substance have not as yet passed beyond the laboratory stage. On account of the high cost of production, further refinements are necessary before commercial scale production can be realized.

Along the lines of economic utilization of by-products, a process has been developed for the production of chlorine gas, a by-product in alkali manufacture which is used as a bleaching compound for textiles.

In the electrotechnical section, an interesting development has been successfully completed in the production of sheet aluminum, made entirely from clay, which is abundant in Japan. The scarcity of bauxite as a natural product of Japan gave the initial impetus to this investigation. The sheet aluminum produced by the laboratory has passed through the semi-commercial scale stage of development. Production costs have been checked and have proven to be as low as those of present practice. Manufacture and industrial scale application is only awaiting the granting of patents.

Chromium plating, developed by the laboratory, to replace nickel plating of bathroom furnishings, etc., has been developed and is in commercial scale production. Considerable royalties under the patent held by the laboratory for chromium plating have been derived from commercial scale production. Some effort in the direction of developing gasoline substitutes has been made and certain derivatives from naphtha seem to indicate possible competitors.

Due to the difficulties encountered in the production of lacquer ware, used extensively at home in Japan, and manufactured for export, particularly in the matter of warping of the wood base, some investigations are in progress to develop light metal substitutes to replace wood base in this ware. The application of lacquer to the polished surface of metal has been successfully accomplished. Up to the present time, however, no light alloy has been developed which has the equivalent weight of wood and at the same time the absorptive characteristics which will permit the surface finish required in lacquer ware. Considerable effort is being made to develop new types of decorative lacquer, particularly gold lacquer, gold lacquer with semi-precious metal or gem dust and other substances which will enhance the artistic appearance of the product.

Formerly the patentable discoveries resulting from research investigations were published freely, and all industries were at liberty to use them at will. Under present practice when a patentable device is perfected by the Institute, the Department of Home Industry of the Government makes an investigation of the industry in which the patent is to be placed and recommends to the officials of the Institute two or three reliable concerns to whom the exclusive right of manufacture is subsequently given. This procedure was found to be necessary by previous experience, since upon the development of a new product or device a number of competitive concerns would rush into manufacturing and only one or two would survive with the result that the number of failures was a matter of concern to the Government. Hence the present system has been developed. In this Government-supported Institute there is no provision for the inventor to share in the royalties accruing from the industrial application of the device. The royalties resulting from the sale of completed products are made directly to the Finance Department of the Government, and not credited to the Tokyo Industrial Research Institute.

The matter of patentable discoveries, which is a moot question in the relation between governments, research institutes, and industry, in Japan, Europe, as well as in America, has received considerable attention by officials of the Japanese Government in an effort to establish a system, procedure, or plan which would provide for an equitable distribution of the profits and benefits derived from the industrial application of the fruits of research.

Representative Industrial Plants

The Oji Paper Company: The Oji Paper Company is one of the largest single units operating in the paper industry in Japan. Although the principal product of this company is the newsprint paper, the Oji Company, or its subsidiary plants, manufacture practically all types of paper. Their line includes high class book paper, stationery—both business and personal, wall paper, cigarette paper, and many other paper products. Selected as a representative industrial plant to make some casual observations because of its location in Tomokami in Hokkaido, away from the influence of the centers of industry in the main island of Honju, the most noticeable feature was that the mills operate continuously, Sundays included, the employees being given two days off a month. The mill operates on two shifts, day and night, one beginning at 6 o'clock in the morning, and the other at 6 o'clock in the evening. The average wages for men are \$1.05 a day, and those for women \$0.75. In line with the usual policy of large manufacturing units in Japan, the Company operates with the co-operation housing system, supply stores and free baths for employees. Rice is sold at a discount amounting to practically wholesale price.

The plant itself, following the best American practice of mass production, is well equipped with automatic and semi-automatic machinery, but a noticeable feature, particularly in the presence of many hazardous operations, was a complete absence of any safety devices. Apparently labor, which can be hired at a low rate, is considered cheap from an industrial hazard point of view. An interesting commentary on the equipment of Japanese industrial plants, which seems to be an indication of the trend of the times, is the gradual replacing of English machinery by American types and makes of equipment. Paper mill machinery, made by Wamsley in England, is being replaced by those of large American manufacturers of paper machinery.

The processes and technology of paper making in this plant, made chiefly from pulp, are conventional and without distinctive feature. It was a surprise to learn that Japan imports considerable quantities of wood pulp from Sweden for the manufacture of finished paper products.

Nippon Electric Company: As a fairly representative plant of the electrical industry, the Nippon Electric Company located at Tokyo was a field for some interesting observations.

Although this plant operates under a manufacturing license agreement with the Western Electric Company, certain modifications in the products to meet local demands and conditions are an index of the requirements in Japanese markets. Eleven hundred employees are at work in this plant. Due to the ravages of the earthquake, limited factory facilities and obsolete equipment may have prevented a fair judgment of existing factory conditions. The operating Vice President informed me that considerable difficulty with labor conditions, particularly in the large industrial centers, was an ever-increasing problem for industrial executives in Japan.

In the technical or engineering phases of the industry's development, Mr. Ohata remarked that "there was a gradual displacement of foreign engineers continually in progress, these men being replaced by an increasing number of engineering graduates from the Imperial Universities, which were gradually taking over the technical administration of the basic industries in Japan."

Seventy men are employed in engineering design and drafting, and a small development section, having a staff of 20 men, is experimenting principally with broadcasting equipment and loud speakers. The development is admittedly not of a fundamental character, but simply such modification as is required for the manufacture of electrical devices under license-agreement from concerns in America which is required by the local trade. These changes consist largely of a substitution of cheaper materials in order to lower costs and to sell the product within a price scale based on purchasing power of local demand.

Contrasted with the type of operators in the Oji paper mill, previously mentioned, the employees of the Nippon Electric Company, being of a higher class, and skilled operators receive an average rate of pay of from \$2.25 to \$2.50 per day, the wages for tool makers running as high as \$3.50 a day.

Commenting upon the influence of pure science research on the industrial technology of representative industries in Japan, Mr. Ohata agreed with the opinions expressed by others to the effect that there was a great gap between pure science research and industrial technology. There seems to be an obvious need for some

national agency to act as a clearing house, a go-between, to bridge the gap between science and industry. There are few research laboratories connected with private concerns in the industry compared to the apparent need for such organizations. The reason for this, as explained by Mr. Ohta, was principally the fact that "industrial executives as a whole were not sold on the research idea and were too largely influenced by selfish motives and interested principally in production and dividends."

There is some consolation in the present situation, however, according to these men, since the officials of the Government and far-seeing industrialists have appreciated the present situation, and some effort is being made to create such an organization. In all probability the specific remedy which will be applied will be the vitalizing of a division of the National Research Council of Japan to be known as the Division of Industrial Research, and using as a model in organization and operation the Division of Engineering and Industrial Research of the National Research Council in America.

General Impressions and Conclusions

In an attempt to get a perspective of the national situation with regard to the organization of research in Japan, the conclusions set forth here are based upon studies and investigations in the technical bureaus of the Imperial Government, the endowed national research institutes, the Association research laboratories, and those attached to private concerns. In three industries—fisheries, aeronautical, and silk—an attempt was made to trace through various steps from pure science to applied industrial technology, as well as the channels of communication and influence on the present industrial structure. The composite picture of the industrial development of Japan is made up of detailed studies of the research agencies and industrial companies described in detail above. Such data has been drawn upon in an effort to crystallize general impressions and formulate conclusions.

The most striking feature and inherent weakness of the organization of research in Japan is the gap between the agencies of pure science, or academic research, and those of applied science operating in the industry. With the exception of such industries as electrical, chemical, and the more technical industries, very few research laboratories are supported by individual concerns.

There appeared to be three reasons for the present situation in research organization. First, there is a too generous subsidy by the Imperial Government appropriated to national research institutes, and extending in some instances to agencies which should manifestly be supported by the industry. The incentive for the establishment of private agencies, due to industrial competition, has been to a large extent removed by the influence of Government regulation of industry through the Department of Commerce and Industry. Although the officials of the Government seem to realize that the ideal to be attained is for a gradual reduction of Government subsidy, and an effort to place the research organizations on a self-sustaining basis, there is little or no concerted movement towards the realization of such an ideal. As previously observed (but repeated here for emphasis) the average industrial executive of Japan is not sold on the research idea. He is, in general, intent upon production and dividends.

A second reason for the present situation is the absence of a national clearing house or central agency for the promotion or stimulation of research in the industries themselves. Obviously this task should be undertaken by a division of the National Research Council of Japan. Some discussion of this proposal during my visit may result in carrying such a project through the realization. Some national agency to interpret the technical problems of industry in terms of research on the one hand and to influence the program of academic research in such a direction as to be helpful in the solution of industrial problems, on the other, is of vital importance as a remedy in the present situation.

Up to quite recently Japan has been suffering industrially from indigestion, caused by an imported technology. A too-ready adoption of technically perfected processes evolved abroad but unsuitable to her conditions and needs, has caused considerable difficulty and the diverted attention from the main problem, namely, the creation of a technology based on the fruits of research produced by the pure science agencies of Japan. A complementary factor has been the limited supply of technically trained men, engineers and research workers, educated in Japan. This situation, however, is rapidly being corrected, and at this moment there is evidence in

several industries of young Japanese graduates of Imperial universities who are assuming technical control of industrial processes and manufacture.

The general trend of research in Japan is towards an exhaustive utilization of natural resources and a refinement of industrial processes, the substitution of cheaper materials, and the output on a mass production basis of articles which can be sold cheaply at home and abroad, rather than an organized effort to produce original processes or technique through scientific research.

One very important factor in the progress of research in Japan is the large number of scientific and research workers who have received their training abroad, particularly in the scientific centres of Germany, England and France. In almost every instance men occupying important positions in research institutes or universities, trained in Germany, will use not only German methods and technique, but insist upon using German apparatus and instruments, and publish the results of their investigations in the German language. The same thing is true of men who have received advanced scientific training in England, France or America.

Dr. Sato, President of the Hokkaido University, stated that this constituted a real problem in the University since on the transfer of scientific personnel it was found necessary to change the entire equipment, apparatus, and instruments of research laboratories, which is an expensive proposition.

The outstanding example of advanced technology among those industries of Japan, which came under the writer's observation was the fisheries industry. The important place occupied by this industry, fifth amongst all industries, is due largely to the fact that fish constitutes, next to rice, the most important ingredient of the national diet. Generous support by the Imperial Government has been given to scientific research institutes in this field and for the technical development of the industry. It is more completely organized in all phases of research than any other with the possible exception of silk. The advance of technology in the fisheries industry, which is said to be more advanced in Japan than in any other place in the world, is not, as might be expected, in the development of by-products or the improvement of processes, but rather in fish culture, the operation of hatcheries, and the infinite pains which are taken in increasing basic production. Strict government regulation of the entire industry acts as an insurance against excessive commercial exploitation. I can think of no better way to express the great success of the fisheries industry in Japan than to say that with the advantage of cheap labor it has been possible to carry the fisheries cultivation technique to such an extent that the employees in hatcheries, marine biological stations, and fishery experimental stations, are virtually acting as "nursemaids to fish." The hatchery operations are carried out with as much or even more pains and care as would be expended on the rearing of children in other nations, China for example. A reference to the description of the culture pearl farms and the operation as described in this report is convincing evidence of this fact.

Stripped of its technical detail, the fundamental reason for the unprecedented advances in research within recent years may be found in the outstanding characteristic of the intelligent Japanese, which is, according to my observation, an inquiring mind and a hunger for knowledge. No opportunity is lost by any Japanese in any station of life to come in contact with foreigners and to acquire as much new knowledge as the opportunity affords, and great care is taken to make a detailed record of newly acquired facts and information, and little time is lost in its application.

Considering total amount of funds expended on research including government subsidies, the number of research institutes, their housing, equipment, personnel, and organization I would place Japan in third position, in the organization of industrial research among the industrial nations of the world, being surpassed only by Germany and the United States.

Yokohama City to Extend Gas Manufacturing Equipment.—With a present equipment of four generators with a total capacity of 2,000,000 cubic feet, the City of Yokohama is planning to add more equipment. It is understood that the new contract will be let to one of the following importers: C. Illies and Company, agents for M. A. N. Waterless, Brunner, Mond and Company, agents for Parkers Corporation (?), and the Mitsubishi Shoji K. K., agent for Koppels equipment.

Tsurumi Steam Power Station of the Tokyo Denryoku K. K.

By J. P. Fish, International General Electric Company, Tokyo

IN June of last year installation work was completed and acceptance tests made on what is one of the most modern steam power stations in Japan, that of the Tokyo Electric Light and Power Company,—Tokyo Denryoku K.K. This station is located on the water front at Tsurumi, a town about twelve miles south of Tokyo. The plant is noteworthy in Japan on account of the use of high-pressure steam, the installation of the largest units in the matter of dimensions which have yet been shipped to that country and the difficulties which were overcome in building suitable turbine-generator foundations.

For the construction of this station a site was chosen on artificially filled land located on Tokyo Bay not far from the main distributing substation of the company's system at Kawasaki. As the land selected was made up of sand fill with an underlying layer of soft clay, it was considered necessary in order to establish suitable foundations for the turbine-generators, to install and sink rectangular concrete caissons in area the size of the turbine foundation and of a depth sufficient to reach the hard stratum 120 ft. below the surface. Supervised by engineers of the Foundation Company of America, these caissons were sunk under air pressure and sealed, and the foundations have proven extremely satisfactory as up to the present time no measurable settlement has taken place. The remainder of the structure including the boiler house, is supported on driven piles with generously designed spread footings.

The area of the site, over 1,000,000 sq. ft. (30,000 tsubo), gives ample room for the coal storage yard. A grab bucket unloader, capacity 100 tons per hour, takes coal from the barges and deposits it on a belt conveyor system which transfers it to the plant, or by means of a 100-ton movable bridge distributes the coal over the storage area. A similar bridge having a capacity of 60 tons per

hour reclaims, by means of a one-ton grab bucket, the coal required for operation, which is placed on a moving belt and carried to the skip hoist located at the east wall of the boiler house. The coal is raised to two 500-ton bunkers served by belt conveyors and led to the stokers by means of down spouts, equipped with automatic coal weighting scales.

For the initial two 35,000-kilowatt units, the boiler house has installed four Babcock and Wilcox cross tube boilers each with a heating surface of 18,611 sq. ft. These boilers are fired by B. & W.

compartment type forced draft chain grate stokers, 3 per boiler, having a total grate area of 540 sq. ft. and driven by three 1 h.p. induction motors with cyclic gear speed changing devices.

The boilers are equipped with plain tube integral superheaters located between the tube banks in the first pass, each set having a surface of 5,900 sq. ft. and superheating to a total steam temperature of 750 deg. F. The economizers are superimposed horizontal steel

tube type, 8,960 sq. ft. area each capable of raising 162,000 lb. of water per hour per unit from a temperature of 210 deg. F. to 290 deg. at entrance to the boiler.

Due to its location on the water front, an ample supply of cooling water is available. The water is led through the plant in concrete water-ways, and discharged into the adjacent canal at a maximum distance from the intake.

Condensers and auxiliaries manufactured by W. H. Allen Sons and Company, England, include two-pass condensers capable of handling 365,000 lb. of steam per hour and employing 50,000 gallons of cooling water per minute. Circulating pumps, condensate extraction pumps, kinetic rotary air pumps and steam jet extractors are provided in duplicate for each condenser and are driven by B. T. H. Company induction motors.



The Tsurumi Power Station, Planned for an Output of 175,000 KV-A., One-half of which is Already Provided



15,000-KV-A. Transformers Built in Japan by the Shibaura Engineering Works



In the Turbine Room

The feed water heating plant for each unit consists of a low-pressure flash evaporator, capacity 23,200 lb. per hour of raw water, and heated by 23,000 lbs. of steam per hour bled from the 14th turbine stage; a deaerator capable of reducing the residual oxygen content to 0.01 CC per litre with a capacity of 403,000 lb. of water per hour; a bleeder heater capable of heating an equal amount of condensate from inlet temperature from deaerator of 159 deg. F., to 218 deg. F., at which temperature it is supplied to the boiler feed pump. Steam for this heater is obtained from the 14th or the 17th turbine stage depending on the operation requirements. Boiler feed pumps are 7-stage centrifugal type, motor-operated, each having a capacity of 760 gallons per minute against a head of 1,060 ft. when operating at 1,480 r.p.m.

Four self-sustained steel stacks (one per boiler) are provided, 11 ft. top diameter, 124 ft. height above firing aisle. Two forced draft and two induced draft fans of the Sirocco multivane type are provided per boiler. For each boiler one forced and one induced draft fan are driven by induction motors. The other two fans are driven by variable speed brush-shifting a-c. motors. Bailey boiler meters and G.E. flow meters are installed. Ashes are removed by hydraulic sluices.

The main generating units for the first section of this plant are two in number, each a G-E 35,000-kw., 43,750-kv-a., 50-cycle, 20-stage 1,500 r.p.m. turbine alternator, taking steam at 350 pounds gauge, 720 deg. F. and exhausting to 28½ inches vacuum. The turbines are provided with nozzles for steam extraction for feed water heating from two different points. Generators are provided with closed ventilation, each surface air cooler having an area of 13,725 sq. ft. and requiring 650 gallons per minute of cooling water at 80 deg. F.

The house service generator is a G-E 2,500-kilowatt turbine alternator set which provides current for operating station auxiliaries in connection with a bank of three 1,500-kv-a. single-phase station transformers with another as a spare. These are 22,000/-3,300/-220-volt three winding units built by the Shibaura Engineering Works of Japan.

The transformer bank and the house turbine are used interchangeably in accordance with the requirements of the feed heating

system. The house service unit has a 4,500 sq. ft. Allen condenser, the condensate being returned to the heating system.

Power from the station is stepped up by means of two banks of Shibaura three winding transformers, each bank consisting of three 15,000-kv-a. water-cooled single-phase units. Transmission at 66,000 volts and 22,000 volts is provided in order to supply the distribution systems operating at these two voltages through the Kawasaki substation.

Practically all of the power generated by the hydro-electric plants of the Tokyo Denryoku system is brought into the Kawasaki substation from the west, southwest and south of Tokyo Prefecture for distribution to districts lying in and around Tokyo.

Low tension switching is accomplished by indoor oil circuit breakers operated from the control room. High tension circuits are controlled from the same room by means of an outdoor switching station, located adjacent to the plant.

It is expected that this plant will show excellent economy as on the initial load run measurements taken by flow meter indicated a consumption of 9.4 lbs. per hour without the use of the feed heating system. Similar machines, except 1,800-r.p.m., 60-cycle, installed at the Nagoya station of the Toho Denryoku K.K. have given a performance of approximately 8.7 lb. per hour based on flow meter readings.

Work was commenced on this Tsurumi station early in 1925. The first unit was placed in service in December, 1926, and has been in operation from that time to the present. The second unit was completed in June of this year and the usual tests made by the Government Communication Bureau were successfully passed. Both turbines have operated to the utmost satisfaction. It is expected that this plant will ultimately contain two additional machines probably to be of the same size and characteristics as the ones now installed.

The construction of this station was carried out under the supervision of Mr. Murao, Chief Engineer of the Tokyo Denryoku K.K. and Mr. S. Yamada who was in charge of the actual construction, and their assistants. The installation of the two turbine alternators was made under the supervision of Mr. Roy Baer of the General Electric Company.

The Antimony Industry in China

WITH the world largely dependent on China for its supply of antimony, both buyers and sellers, as well as all connected with the trade (directly or indirectly), are anxious to have information regarding prices and supplies of this metal. Much has been written on antimony, but most of the information given has emanated from interested parties. In giving below his candid view of the future of the antimony trade in China, the writer would like to make it quite clear that he has no "axe to grind."

As is well known, the province of Hunan supplies more than half of the world's requirements of antimony, and has the richest deposits. A large demand from America and Europe has resulted in increased exports from China, as the following figures show:—

	1924	1925	1926
Antimony, Regulus	176,852 piculs.	281,312 piculs.	299,033 piculs.
Antimony, Crude	31,291 "	45,397 "	53,534 "
Antimony, Ore	9,423 "	34,509 "	—

(1 picul=133½ lbs.)

America is the largest buyer, then Germany, and then England. Most of China's production of antimony comes from the large number of small mines in Hunan, worked in very primitive methods by a host (about 300 to 400) of small mining companies. Before the crude or regulus reaches the foreign or Chinese exporter it passes through several hands. Had the Chinese better mining equipment and machinery, and a more scientific and technical knowledge of mining, China could easily supply all the world's requirements in antimony, and at very low prices. At present the mines do not work regularly, but merely at times when it is most profitable to do so. There is a movement on foot among Chinese circles interested in the antimony market (at the mining centers) to combine and organize a co-operative selling agency, with a view to maintaining prices at their present high level. With the growing industrialization of China and her closer contact with the Western world, it is hardly likely that the mining industry will not keep pace with the general progress. Improvement in mining

methods, the use of modern machinery, and with proper management, will result in an increase of output, which a few capitalists will not be able to control. So far, there have been too many intermediaries, and direct contact with the small Chinese mine on the part of foreign firms established in China (at Changsha) would lead to a larger and more regular output and more reasonable prices. Chinese mining companies should be assisted with advice and instruction in the use of modern mining machinery and the science of mining. One economic way of effecting this indirectly is by training Chinese students abroad in up-to-date methods. This is being done in a general way, but how many Chinese students are making a special study of antimony mining?

Antimony mines in South America and elsewhere hesitate to start production on any large scale (or even to start at all), because they are afraid that increased production in China, with her unlimited supply and cheap labor (which is also as plentiful), would soon put them out of business. The recent troubles in China have not interfered with the antimony trade as much as was generally expected abroad, and if people here would only bear in mind that Chinese disturbances (political and/or military) do not preclude business, there would be more confidence here in that market and investigation undertaken as to the possibilities of effecting increased production and lowering prices. Competition should be encouraged among the Chinese, and Chinese mining companies assisted (not necessarily financially, but technically). This would result in mining in China gradually extending and improving (methods, machinery, and technique), and, with this improvement, prices will fall and production increase. Restriction in output would hardly be possible if there were more competition among the Chinese themselves. Hunan is not the only province where antimony is mined; this metal is also found in Kwantung, Hupeh and Kwangsi. It is for the Western world to spread the necessary knowledge of modern mining and the use of modern machinery and implements among the Chinese.

The Great Wall of China*

By Sherwood A. Cheney, Colonel, Corps of Engineers, Formerly Military Attache to China

ONE hesitates to add to the mass of estimate and conjecture on the subject of the Great Wall of China, especially in an engineering magazine, for engineers are supposed to be hard-headed individuals, interested only in solid facts and precise figures. Of such, so far as the Great Wall is concerned, there are but few available.

But the mere fact that this greatest single work of man, distinctly a work of military engineering, remains so largely a subject for estimate and conjecture is in itself a challenge. In this day, when men of inquiring and trained minds are turning over all the old stones and burrowing into all the buried cities, it is safe to say that it will not be long before some one undertakes the task of finding out just what and where the Great Wall is. The following notes may serve to suggest that such a task will not be a light one.

This greatest work of military engineering has never been adequately examined or described. All descriptive books on China, except the most famous one (Marco Polo), contain some mention of it, and practically all maps of China show in a general way its location. But, when one attempts to put together the real information to be derived from such sources, one is astonished at the meagerness of the result. One gets estimates as to the total length of the wall for example, varying by a thousand miles. Dimensions and descriptions of the style of construction are only in the most general terms.

The writer has found just one cross-section of the wall, showing dimensions and style of construction, and that is the work of an officer of the Corps of Engineers. When Second Lieutenant (now Colonel) H. B. Ferguson was in Peking in 1900-01, in command of the engineer detachment of the China Relief Expedition, he caused cross-sections to be taken of various Chinese walls, of the Tartar City, the Chinese City, the Forbidden City and the Imperial City, and of the Great Wall at Kalgan. At the particular point where the section of the latter wall was taken, it was 17 feet, 6 inches, thick and 16 feet high, made of two face walls of large brick, filled between with earth and stones. On the Chinese side, the face wall is carried up to form a parapet 3 feet high, and on the Mongolian side the parapet is 5 feet high, cut down at frequent intervals with machicolations. These features are characteristic of the wall wherever it is fully preserved, and enable one to identify the enemy face from the Chinese face in photographs.

There is nothing formidable about the cross-section of the Great Wall. Compared with the many city walls of China it is a modest affair. The walls of the Tartar City of Peking, for example, are 40 feet high and 60 feet thick at the base. What impresses the visitor to the Great Wall, as he observes it wandering in an apparently aimless fashion over the spurs and peaks of the almost inaccessible mountains in the vicinity of Nankow Pass, where most tourists see it, is the thought of the incredible amount of labor and material that was put into it.

Two American engineers who visited the Wall at Nankow last fall amused themselves by making some rough figures on it. The guidebook told them that it was 1,500 miles long and that it was built during the reign of Chin Hwang-ti, who rules forty years, both of which statements are incorrect. On these assumptions and assuming that the wall throughout its length preserved the same style of construction as that observed at Nankow (which, of course, it does not), these gentlemen reached the conclusion that the construction of the wall must have occupied the undivided efforts of 9,000,000 workmen over a period of forty years! As their assumed length for the wall is short by about 1,000 miles, it is possible, in spite of the other errors in their assumptions, that their conclusion is not greatly in error. This guess is as good as any other, for nobody knows how long the wall is, and nobody can give its dimensions and style of construction, save in a few well-known places.

The magnitude of the task of building this structure becomes all the more impressive when one reflects that, throughout the greater part of its length, it traverses regions so inaccessible, so rough, and so dry that one can penetrate them only if supported by an elaborate system of water and food supply.

Professor Geil, who made a reconnaissance of the wall about 1908, visiting both ends of it and several intermediate points, estimates the total length of the Great Wall, including all known spurs, curves, and loops, at 2,550 miles. He also estimates that there were some 25,000 watch-towers built into the wall and some 15,000 detached watch-towers. The air-line distance between the point where the wall reaches the sea at Shanhaikwan and the western terminus, identified by Professor Geil on the Great White River west of Suchow in the pan-handle of Kansu Province, is 1,145 miles.

It is precisely in its character as a work of military engineering that we are entitled to think of the Great Wall throughout its entire length and in all its ramifications as an entity. Although its

original conception is usually attributed to one man, it had many builders; its construction, amplification, and repair have gone on at intervals over a period of at least 2,000 years; and, in its structural details, it varies all the way from solid masonry of the most excellent character, showing cut-stone and brick work of the best quality, concrete and mortar comparable to the best Roman practice, to the merest barrier of mud and reeds, now buried by the sands of the desert, or entirely swept away by the winds of centuries. But, reaching through all these years, and unifying the whole effort that went to make the wall, was the same purpose: to create a defence against the warlike tribes of the northwest.

It can not be claimed that the Great Wall was a complete defence against the Mongols, for they succeeded in breaking through it on no less than four occasions, with large forces. Nevertheless, against smaller parties of wandering horsemen it must have afforded



The Great Wall, Shanhaikwan

* The Military Engineer



The Great Wall on Nankow Pass Near Peking

an effective protection to the Chinese farmers living within it. The Mongol is a true cavalry-man, and never moves over a hundred yards on foot. If you can stop his horse you stop him, and, even in its less elaborate portions, the wall was originally of sufficient height to be impassable to mounted men. That it did serve a useful purpose in keeping out minor incursions is evidenced by the fact that every strong Chinese emperor, down to and including Chien Lung in the eighteenth century, repaired, extended, and strengthened the Wall. It is not possible that this work would have gone on for over twenty centuries if the barrier were not considered a useful and effective defense.

Some foreign (that is, non-Chinese) military men have been inclined to look upon the Great Wall as a monument to the un-military qualities of the Chinese race. Not all, however, for we are indebted to Colonel H. d'Ollone, of the French Colonial Army, for quite a different view. I take the liberty of quoting from his work, entitled, "La Chine Novatrice et Guerrière," in which he presents the following interesting conception of the Great Wall:

During these centuries of internal warfare the Huns had unceasingly driven their terrible incursions across the frontier. As a defence, the neighboring kings had raised fortresses in all the defiles of the mountains. The First Emperor (Chin Hwang-ti) conceived the idea of connecting these *forts d'arrêt* by a continuous enceinte. So the "10,000 li wall" was built (one li=1/3 of a mile, more or less), the most gigantic work of man.

The Great Wall has been the theme of endless mockery: it has been referred to as the conception of an unwarlike people, which could only hide behind a wall, of a people so devoid of military sense as not to see the strategic absurdity of such a means of defence, which could not be guarded throughout its entire length. With all due respect to these mockers, the Great Wall was an irreproachable conception. Against adversaries who could not be followed up and destroyed, who had no fixed homes or property, there is no other defence. It was not sufficient for the Chinese to fortify towns; the whole countryside, the crops and the peasants, must also be protected. The nomads of Mongolia were horsemen: the Wall stopped them. Their horses, used to any terrain, could go almost anywhere. There was no break in the Wall, even on the steepest slopes. The invaders could certainly capture by assault a foothold on the Wall, but they could not get their horses past it; for a wall 10 meters high, 10 meters wide at the base, and 4 meters wide at the top—such are the dimensions in most of the easily accessible passes—is not easily demolished by nomads without tools. Nevertheless in the end they would have succeeded, if the Wall had not served its essential function, which seems to have been lost sight of by modern critics and yet is

of prime importance from a military point of view: the Wall formed a perfect strategic road, by which the defenders could be rushed to any part of the frontier to repel the attack. Four meters wide at the top, it afforded an ample way for the passage of troops. The parapets on each side protected their march from arrows. Its height deprived the enemy of his favorite method of attack, the mounted charge. Every hundred meters there were towers astride of the Wall, which prevented the enemy, who had gained a foothold, from extending his holdings along the length of the Wall. The reinforcements had, therefore, a safe and quick way to the point of attack. Moreover, three great roads, a hundred meters wide and 10 meters high, one along the seacoast and two leading from the capital, brought reinforcements from the interior and completed the defensive system.

It is its function as a *chemin de roude* which accounts for the fact that there is no break in the Great Wall, even in places where the slopes are so steep that no approach is possible. It is in just such country that a practicable road is indispensable, and in fact the Wall in such places is reduced to little more than a road raised

just enough for drainage. The European deduces from this that the Chinese, with their well-known propensity for *saving face*, have neglected the part of the work that they thought would not be seen, a ridiculous conclusion, which only goes to show the absurdity to which our habitual scorn of everything that does not conform to our own prejudices may lead us.

In reality, in its general plan as well as in its details, in the width and continuity of its roadway, in the organization of its defensive works and the roads related to it, the Great Wall, far from indicating a lack of military intelligence in the Chinese, shows a very advanced strategic conception which I should venture to qualify as modern. Instead of indicating an inert and craven defensive, as often alleged, it is a system of frontier defence which, with a minimum of force, retards the enemy by obstacles, and by covered ways provided in advance, brings the troops of the defence quickly to the threatened point. Moreover, one should remember that the Romans, whose military virtues have never been questioned, by the orders of two great warrior emperors, themselves built two great walls, that of Hadrian and that of Trojan, which had the same object, but which did not in any comparable degree have the characteristics, magnitude, or cleverness of conception of the Great Wall of China.

I have not been able to identify the location of the three great military roads referred to by Colonel d'Ollone, and it is necessary to admit, I think, that it is only in the better built portions of the Wall, say in Chili Province, that its top could have served as a useful roadway for a column of troops. Even here there are places where the Wall climbs such steep slopes as to render it almost impossible to move troops along the top, provided though it is with steps. And I have seen one photograph of the wall in the vicinity of Kupekow Pass, northeast of Peking, where it comes up to a sheer drop of 50 or 60 feet, and carries on again from the foot of the cliff. These places suggest the thought that, if the guiding



The Gate at Nankow Pass Near Peking

idea in locating the wall was to provide a roadway, a better alignment might have been found.

I have noted that foreigners residing for any length of time in China are apt to fall into one of two groups; one, that comes to find in all things Chinese, reason, beauty, and utility; another, that finds in these same things only futility and "front." Colonel d'Ollone evidently belongs to the former group. The Chinese are essentially a practical people, and the fact that every strong dynasty for many centuries has repaired or extended the Great Wall is solid proof that they, at any rate, found it a useful protection. The Western mind is inclined to agree with the ancient Greek: "Men not walls make a city."

The Willow Palisade

The Great Wall proper, which is usually considered to have extended from the sea at Shanhaikwan to a point west of Suchow in Western Kansu, had important extensions on either end. On the eastern end was the so-called Willow Palisade, which took off from the angle of the wall a few miles north of Shanhaikwan, extended in a northeasterly direction along the boundary between Chili Province and Manchuria to a point about 45 miles north of Mukden, then swung around to the east and south, reaching almost to the sea west of Antung at the mouth of the Yalu River. This barrier, as indicated on existing maps, was not less than 500 miles long and, inasmuch as it was built with much the same object in view, may be considered as an integral part of the great barrier as a whole.

Kita Karafuto Sekiyu K.K. (North Saghalien Oil Company, Limited.)

PRESENT production of this company's wells is said to be 250 tons a day, despite the winter season. (250 tons about 1,500 koku) This is an increase of 200 to 300 koku over the summer months when production is naturally high. The quality of the oil now flowing is said to be remarkably good, being on an average of 19 to 20 degrees Baume, rising at times to 25 degrees.

The quality of the oil being better than originally expected some 3,000 koku have been sold to the Nippon Oil Co., as a sample. The 20 degree Baume is a little better than that from the Niitsu field, and the price is lower. Consequently if production increases, the Nippon Sekiyu will continue to buy.

This company owns eight fields in North Saghalien; producing wells at present number 17. Their average depth is 15 to 18 meters. Of these wells only one is operated by the rotary system, the others are operated by ropes. Deep boring is not necessary in these fields.

Production since April is estimated at a total of 300,000 koku. Estimating production from December to March 1928 at an average of 1,000 koku a day, the grand total for the year will be 420,000 koku. This is a little more than the original estimate for the second year which was 67,000 tons, or 403,000 koku. Deducting consumption at the wells, sales are estimated at 375,000 koku, and revenue at Y.2,019,000 about Y.3.23 per koku. Adding miscellaneous revenue the company's earnings total Y.2,027,000. Expenses are put at Y.1,436,000, leaving a profit for the year of Y.591,000.

A British-Engined Chinese Vessel*

Unique Motor Passenger Craft for Yangtze Service

DESPITE the somewhat disturbed state of affairs in China, progress continues to be made in the use of motor craft and a certain degree of enterprise is being shown by some owners.

There appears to be considerable scope for the use of fairly large passenger boats operating over comparatively large distances, and such services have, in the past, been maintained chiefly by steamers.

At the end of August the trials were completed of a motor vessel for this purpose of a type which has not previously been built and which, therefore, aroused the greatest interest in China.

This craft, the general arrangement and engine-room plans of which were published in *The Motor Boat* of July 29, has been built by the Shanghai Dock and Engineering Co., for service on the River Yangtze between Ichang and Chungking, a distance of approximately 300 miles. The owners are the Nippon Kisen Kaisha, and the vessel is 136 ft. overall (130 ft. b.p.), the beam being 24 ft. and the depth 6 ft. 6 ins. The loaded draught is in the neighborhood of 4 ft. 4 ins., and on trials, with the vessel light, was 2 ft. 11½ ins., a speed of 12.74 knots was attained.

On the upper deck are three two-berth first-class cabins and one with a single berth, whilst the accommodation for the chief engineer and the captain

is also on this deck. Second-class passengers are accommodated in six four-berth staterooms and there are cabins for the pilot and for the stewards. Twenty-eight third class passengers can be carried forward of amidships in open berths and aft there is room for 20 further third-class passengers.

Semi-Diesel Machinery

The propelling and auxiliary machinery is of the Gardner type and the two main engines are among the largest of this class that have yet been built. They are six-cylinder units of 300 b.h.p. each, being located in the engine-room amidships and exhausting into the funnel. The exhaust gases are discharged into separate silencers in the engine-room before reaching the funnel.

The engines are of the direct reversible standard type, and forward is an auxiliary unit consisting of a Gardner engine driving a dynamo and compressor for the supply of starting air. The fuel capacity is on a somewhat large scale, each main fuel tank, one to port and one to starboard, having a capacity of nearly 1,350 gallons. The fuel consumption is in the neighbourhood of 35 gallons hourly.

The name of the vessel is "Chia Ling Maru."



The "Chia Ling Maru," a Chinese Motor Vessel Said to be the First of Her Type Yet Built

**The Motor Boat.*

Electric Power in Japan

By I. F. Baker, Director of the Westinghouse Company, Japan

AT this time, just forty years since the introduction of electric power to Japan, it is appropriate to consider the economic assistance which electricity offers to mankind and more particularly that portion of the world which touches the waters of the Pacific Ocean.

The first servants of mankind were no doubt

human beings themselves, and evidence of this exists in the gigantic engineering works of Egypt. The Pyramids and other structures were built by the intense application of thousands of human bodies controlled by a few master minds. Later on animals were domesticated to such an extent that they superseded to some extent human toil, and as civilization progressed the power of the wind was utilized for the propulsion of ships and driving of light machinery. The last century witnessed a great development in civilization by the use of steam, and steam power still has a powerful influence in increasing the comfort and efficiency of human beings. However, it is becoming more and more evident that electricity will be the universal power of the future.

The present electrical horsepower of Japan is approximately five millions distributed among seventy million people. If we assume that one horsepower is the equivalent of the physical effort of fourteen men, it will be seen that each person in Japan has at present one electrical servant. Such servants do not insist upon an eight-hour day; they are ready to work at any time, and to their extensive employment in Japan is due much of the great advance in industry as well as the improvement in the standard of living which has taken place. That the limit has not been reached is shown by the fact that in the United States electrical development has reached forty million horsepower, which provides three electrical servants for each inhabitant, thus raising everyone to the situation of an employer of labor and placing him in the desirable position of greater income with less expenditure of physical labor and shorter hours of work.

That Japan is approaching this condition is shown by the fact that power consumption is doubling every five years. This increased use of power is caused by its application to the electrification of existing mills, the manufacture of chemicals and a widespread increase in use in the home.

The value of electricity as a motive power in mills has long been

recognized, but another field has now opened which is freely predicted to be of equal importance in high-grade manufacture, that is the use of heat processes in building goods for the market. The best grades of steel are not only refined in electric furnaces, but the best tool steel is finished in electric tempering furnaces. Furthermore, these furnaces are unequalled for tempering wire, the higher grades of glass, and other materials which require close temperature control to give satisfactory results. Tons of expensive lenses are now imported into Japan each year which would be annealed locally with the aid of electricity. Electric heat permits the common

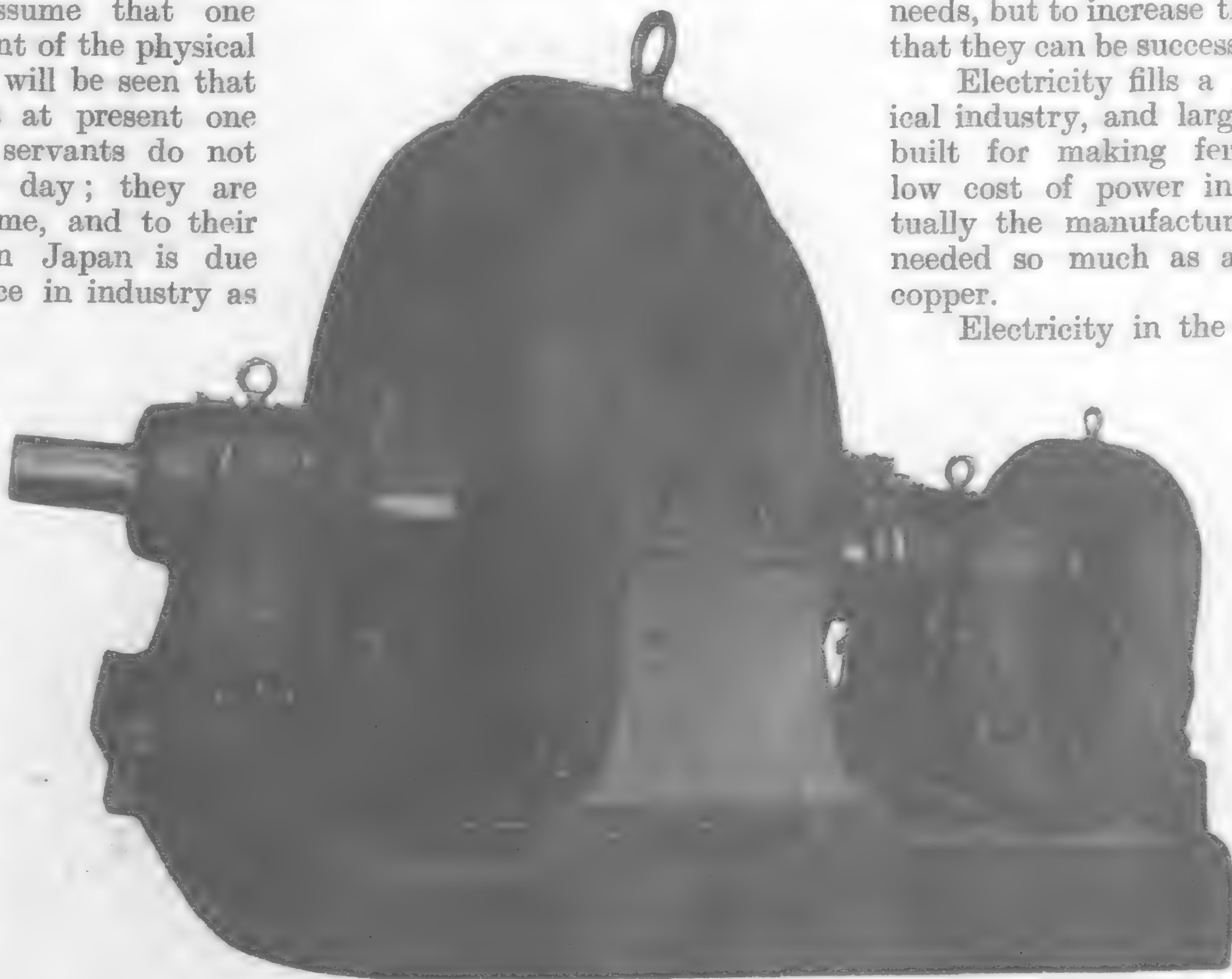
laborer, with no special knowledge of heat treatment, to produce a better product than the experienced treater who uses fuel fired equipment. Surely here is a field of the greatest importance, as it enables a country not only to supply its own needs, but to increase the quality of its products so that they can be successfully exported abroad.

Electricity fills a primary need in the chemical industry, and large electric plants are being built for making fertilizers. Furthermore, the low cost of power in Japan will permit eventually the manufacture of aluminum, which is needed so much as a substitute for steel and copper.

Electricity in the home is now considered a necessity. Every year thousands of charcoal hibachi are replaced by the more clean and healthful electric heater. The electric iron and fan are familiar friends in hundreds of thousands of households, while many electrical devices for cooking and heating are extensively used. Another great field is that of refrigerators. It is expected that 1,000,000 electric refrigerators will be marketed in the United States this year, and their use will no doubt



Manufactured at the Kameido Workshop. Sold to the Shin-etsu Denryoku K.K. Shin-etsu Electric Power Supply Co., Ltd.



5,000 Kw. Hitachi Generator Operated by Water Turbine



Switchboard Installed in Sub-Station of Kawasaki Works

spread to Japan. Therefore, electricity not only provides heat in winter, but comfort in summer by fans and cold storage by refrigerators.

Japan is rich in water power, and statistics show that from this source is being realized ten billion horsepower hours per year. Reduced to simpler terms, this is the equivalent of five million tons of coal saved annually, which at a low rate of Y.10 per ton, means a saving of Y.50 million worth of that valuable resource.

It is well-known that Japan has a limited supply of coal, perhaps enough to last 250 years if the present rate of consumption is not exceeded. By a simple calculation it can be shown that the hydro-electric power already developed has prolonged the supply of coal by 40 years. The present and future [development of water power is, therefore, of immediate interest to everyone in Japan, in order to save coal. The Imperial Government has already assisted such enterprises by granting power concessions to worthy companies. Furthermore, extensive electrification of the railways is taking place to substitute the power of water for that of steam. However, the development of hydro electric power requires large sums of money, and it is not an easy problem to provide this. The installation of a horsepower of water power costs about three times the investment of a horsepower of steam, and with a restricted appropriation of money there is great temptation for electric companies to install the less expensive steam power. Of course the expense of coal and the shorter life of a steam plant raises the cost of power until it is more than that of power from a hydraulic plant; nevertheless, the demand for electricity must be met in some way with the funds available.

One handicap which exists is that the bonds issued by a company cannot exceed the paid up capital stock. This means that some companies in Japan must sell more stock before they can carry out plans for expansion. A company must, therefore, pay a high dividend of 9 or 10 per cent. on the stock in order to sell it, whereas they can borrow money at 7 per cent. It has been suggested by several financiers that this situation can be easily and safely remedied by the change in the law to permit the issue of Y.2 in bonds for every yen of stock issued. This would provide cheaper and simpler financing, making a healthy condition in the company and benefitting the public at large.

Some countries on the Pacific are not so fortunate in possessing large water power sites, but they are endeavoring to improve their economic condition by other natural resources. In Australia, for example, there is a tremendous deposit of low grade fuel called "brown coal," which can be burned in boilers; hence a large power plant has been erected at this spot and the power is being transmitted to some of their larger cities. Development of hydro-power, and electrification of railways is also proceeding steadily in New Zealand and in Java. The unrest in China has greatly retarded the develop-

ment of power in that enormous country, except in the protected district of Shanghai, where the use of current is progressing at about the same rate as in Japan. However, the total developed power in China, if distributed among all their people, could only afford one electrical servant for every 70 inhabitants, so that electricity has, thus far, done little to lighten the grinding toil of that country. The advantage of electric power is clearly recognized in Russia, and large projects are contemplated there which will be of great assistance in building up that nation.

The sum total of the widespread use of electricity in countries of the Pan-Pacific Association will make the Pacific Ocean truly the center of unequalled happiness and prosperity.



Dust-proof Switch Box Supplied to Fushun Mine, 3,000 V., 200 A. Manufactured by Fusi Kawasaki Works

Japanese Steel Co-operation

The tendency towards amalgamation in the iron and steel industry is manifesting itself not only here, but in all parts of the world, and the latest important development in this direction comes from Japan.

The largest three Japanese iron and steel firms have now agreed to a partial amalgamation and the setting up of a joint selling agency in order to increase efficiency.

The firms concerned are the Fuji Steel Manufacturing Company, the Kamaishi Iron Manufacturing Company, and the Japan Steel Company, which between them have a yearly output of well over

135,000 tons of steel and control about half the Japanese production.

Co-operation between these three is, however, only a first move in a scheme which it is hoped will eventually include all the iron and steel firms of the country.

Negotiations are at present being carried on between the group and three other companies, the Osaka Iron Manufacturing Company, the Kobe Steel Manufacturing Company, and the Kokura Steel Works.

As a result of these it is anticipated that these firms will join in the agreement shortly and will probably be followed by others.



Bago River Bridge, Bacolod South Road, Province of Occidental Negros

New Bridges and Roads in the Philippines

THE following are some of the more important bridges constructed or under construction during the year 1926:

Palico Bridge, Batangas Province.—This is a 160-ft. steel pin connected truss located on the Batangas-Nasugbu Road. The fabricated steel was furnished by the Atlantic Gulf and Pacific Company at a unit price of P.0.274 per kilo. The erection was undertaken by administration. The work of tearing down the old wooden truss bridge was started in November, 1925, and the erection of the steel truss was begun during the early part of 1926. The bridge was completed and opened to traffic on March 20, 1926.

Manghiniao Bridge, Batangas Province.—This bridge is a 15-meter concrete arch with spandrel walls and approach spans, with a total length of 33 meters. This structure replaced the old Spanish adobe bridge of 9.20 meters span which collapsed due to scouring at the foundation. It is located on Km. 122.2 on the Bauan-Taal road.

The excavation work was started in April, 1926, and actual concreting operations begun during the month of May. The work was carried out by administration. The bridge was completed and opened to traffic on August 15, 1926.

Quinoguitan Bridge No. 29.9, Loay-Interior Road, Bohol Province.—This bridge is a 12-meter arch span on concrete abutments. The construction of

this bridge was awarded to Mr. Marcelo Regner of Cebu for the sum of P.16,685. The total cost of the bridge including surcharges and the construction of the approaches was P.20,333.78.

Quingua Bridge, Bulacan Province.—This is an old bridge but another steel span of 130 feet had to be added at the north end to provide more waterway and prevent further erosion on the north bank. The furnishing of structural steel was awarded to the Atlantic Gulf and Pacific Company by contract for P.12,000. The construction of the new abutment and steel span and the repair of the old north abutment were undertaken by administration at a total cost of P.37,009.81.

Butac Bridge, Ilocos Sur Province.—Twenty-five per cent. of this bridge was completed at the end of the year. Total expenditures and liabilities amounted to P.17,314.20. The bridge is estimated to cost approximately P.30,000 when completed. The project is being undertaken by administration.

This is a suspension bridge of 160-ft. span with steel towers and rubble masonry abutments. It is located at Km. 388.46 on the Tagudin-Cervantes road.

Binan Suspension Bridge, Laguna Province.—This project was awarded to Mr. Gregorio de Silva for P.10,500. The work accomplished was the construction of a 110-ft. timber suspension bridge which was started on February 12, and completed on March 20, 1926, at a total cost of P.11,864.56.



Talaban Dacu River Bridge, Bacolod South Road, Province of Occidental Negros

Cadael Bridge, La Union Province.—The reconstruction of this bridge was authorized in April. The total sum of P.10,243.02 was appropriated for the project. The contract was awarded to Mr. Fortunato Concepcion for the sum of P.8,400, to be completed in 80 working days. Work was started on June 28, 1926, and consisted in constructing complete two reinforced concrete approach spans and the lowering of the old 9.50-meter "I" beam span along with the concrete floor to the newly established bridge seat. Total expenditures and liabilities amounted to P.10,131.21. This includes surcharges and the lowering of the road the to required grade which was done by administration.

Carmen Bridge, Pangasinan Province.—This bridge consists of thirteen 160-foot steel spans to be erected on twelve concrete piers and two end abutments, with timber pile foundation. The construction of the substructure is being done under contract by Mr. William Anderson for the lump sum of P.134,994, the work to be finished within 160 working days.

The contract for furnishing the structural steel for the superstructure has been awarded to the Atlantic Gulf and Pacific Company at a unit price of P.0.177 per kilo, delivery to be made F. O. B., Manila within 220 days. Bids for the transportation and erection of the steel trusses including the laying of the concrete flooring are to be advertised during the early part next year.

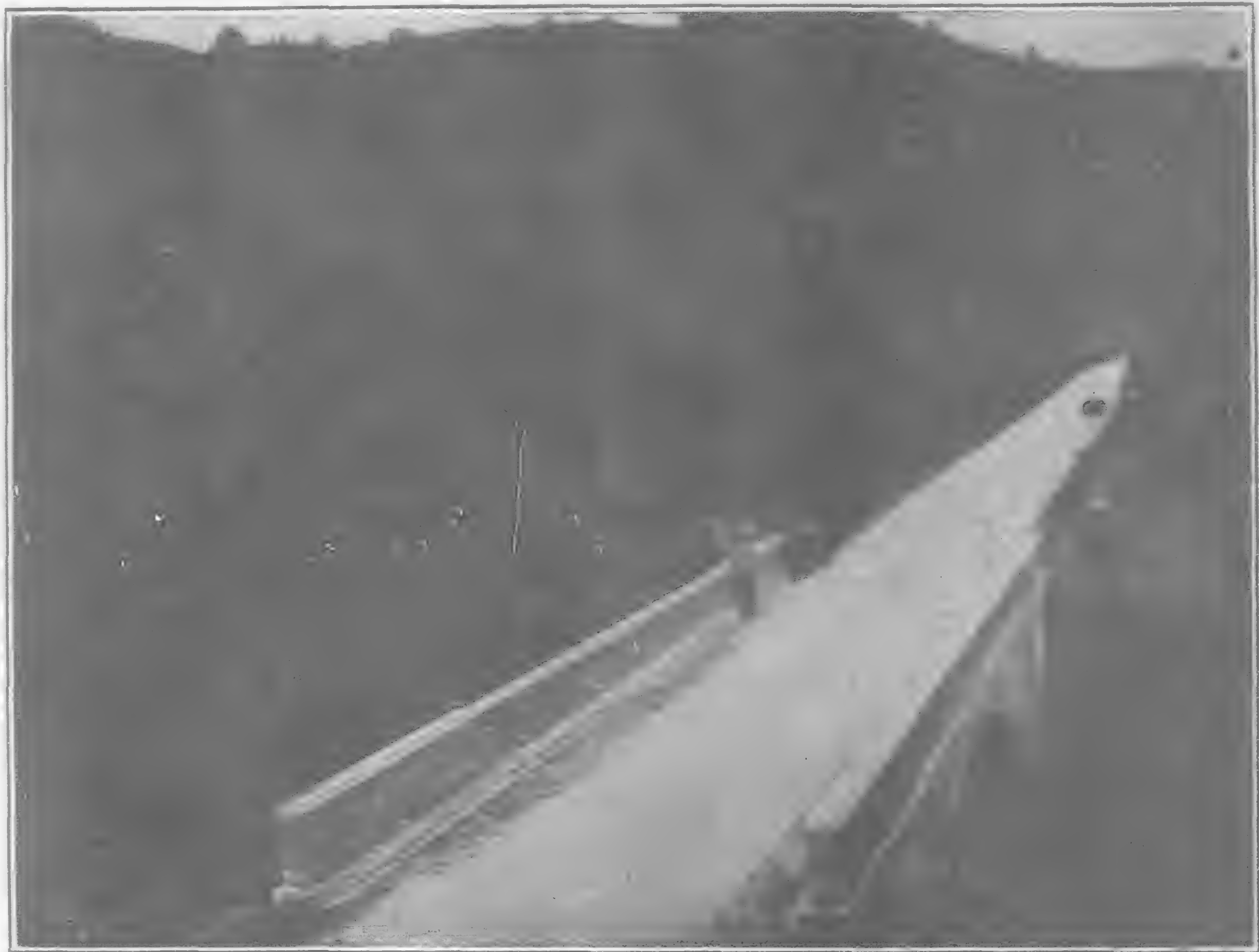
Work was started on the substructure on October 13, 1926, and at the end of the year 11 per cent. of the work had been completed. The total expenditures and liabilities during the year were P.344,955.06.

Tinajeros Bridge, Rizal Province.—The reconstruction of this bridge was contracted by Messrs. Tan C. Tee & Company for P.24,256.30 and the project was completed on November 2, 1926. The work accomplished was the construction of five spans of reinforced concrete slab and girder superstructure, concrete pier caps, and the demolishing of the old Spanish masonry arches. The total cost of the reconstruction work including the construction of the approach walls, which was done by administration, amounted to P.29,159.93.

Benguet, Subprovince of the Mountain Province.—Three wooden pony truss bridges at Km. 269.65, Km. 251.70 and Km. 253.20 were replaced with 60-foot steel trusses. The cost of construction was P.6,263.35, P.5,882.10, and P.6,128.10, respectively.

Important permanent bridges partially or completely constructed during the year 1926.

Province	Name	Bridge and Kilometer number	Type	Span in meters or feet
Batangas	Palico	177.2	Steel truss	1.160-ft.
do.	Manghiniao	122.2	Concrete arch	1.15.0 m.
Benguet Subprovince		251.70	Steel truss superstructure only	60-ft.
do.		253.20	do.	60-ft.
do.		289.65	do.	60-ft.
Bohol	Quinoguitan	29.9	Concrete arch	1-12.0 m.
Bulacan	Quingua	43.5	Steel truss	1-160-ft.
Camarines Norte	Talisay	10.5	Pony steel	80-ft.
Ilocos Sur	Butac	288.4	Suspension	1-160-ft.
Laguna	Binan	36.0	do.	1-110-ft.
La Union	Cadael	273.4	Concrete girder	2-5.35 m.
Pangasinan	Carmen	192.0	Steel truss	13-160-ft.
Rizal	Tinajeros	11.8	Concrete girder	5-12 m.



Quinoguetan Bridge, Loay Interior Road, Bohol Province

Roadway in meter				Percentage of work completed	Total Expenditures and Liabilities
4.88 M.	...	...	...	100	P.36,120.42
4.88 M.	...	...	...	100	24,160.77
4.20 M.	...	...	...	100	5,882.10
4.20 M.	...	...	...	100	6,128.10
4.20 M.	...	...	...	100	6,263.35
4.88 M.	...	...	...	100	20,335.78
16-ft.	...	...	...	100	37,009.81
16-ft.	...	...	...	50	30,292.52
9-ft. 2-in.	...	...	...	25	17,314.20
9-ft. 2-in.	...	...	...	100	11,864.56
4.88 M.	...	...	...	100	10,131.21
16-ft.	...	...	...	11	344,955.06
488 sidewalks 2-1.20 M.	...	...	...	100	29,159.93

The Kenon and Naguilian Roads

These two Insular roads to Baguio were maintained in good condition at a very reasonable cost. On the Kenon Road, three wooden pony truss bridges at Kms. 269.65, 251.70 and 253.20 were replaced with 60-foot steel trusses; while a number of sharp curves were eliminated and roadway widened at dangerous points on the Naguilian Road.

A comparative statement of traffic over these roads for the years 1924, 1925 and 1926 is given hereunder:

Summary of traffic over the Kenon and Naguilian roads

KENON ROAD.

Year	Pedestrians	Bulcarts	Animals led or ridden	Calesas	Motorcycles	Autos (passenger)	Autos (trucks)	Wagons
1924...	12,173	2,924	198	—	1,150	6,137	4,398	48
1925...	10,743	1,176	159	1	543	7,080	4,439	58
1926...	10,004	1,635	—	—	441	8,253	4,655	70

NAGUILIAN ROAD.

Year	Pedestrians	Bulcarts	Animals led or ridden	Calesas	Motorcycles	Autos (passenger)	Autos (trucks)	Wagons
1924...	23,136	8,538	676	13	112	4,455	8,436	315
1925...	19,893	2,173	516	—	190	9,032	4,164	2,084
1926...	26,808	3,062	1,878	6	84	9,734	4,405	2,448

ROADS.

As has been the case for the past six years, it was necessary during 1926 to use the larger part of the available road and bridge funds for the maintenance of existing roads, which resulted in a

comparatively small increase in the kilometerage of improved roads. During the coming year, however, funds amounting to P.1,700,000 will be available from Act 3248 (Gasoline and Oil Tax Law), which, together with the increased insular appropriations of P.3,300,000, will permit a more active construction program. The following tables Nos. 1-A and 1-B show the source and amounts of funds available for road purposes during past years and also the relative amounts expended for maintenance and construction:

TABLE 1-A.—Funds for road construction and maintenance.

Year	General taxation (provincial road and bridge funds)	(Act 3045) auto- mobile registra- tion and license fees	Insular appro- priation	Total
1922 ...	P.4,469,555.00	P.518,825.85	P.3,245,000.00	P.8,233,380.85
1923 ...	3,999,756.00	628,918.54	2,380,000.00	7,008,674.54
1924 ...	4,326,878.00	633,214.36	2,400,000.00	7,360,092.36
1925 ...	4,406,320.00	798,438.62	2,517,327.00	7,722,085.62
1926 ...	5,871,384.99	985,051.28	2,705,000.00	9,561,436.27

TABLE 1-B.—Amounts expended for road construction and maintenance.

Year	Maintenance	Construction	Total
1922 ...	P.5,050,554.19	P.2,197,565.64	P.7,248,119.83
1923 ...	5,356,230.19	2,007,147.73	7,363,377.92
1924 ...	5,693,466.40	2,619,316.68	8,312,783.08
1925 ...	5,873,078.83	3,545,890.66	9,418,969.92
1926 ...	5,806,013.33	3,689,750.14	9,495,763.47

It will be noted from the above tables that there has been no appreciable increase in available funds for a number of years while the cost of maintenance has risen considerably. This is largely due to the increasing use of motor vehicles, which in many localities has reached a stage where the construction of hard surface pavements will be a good investment. On sections of the Manila North and South roads and also on sections of other roads subjected to very heavy traffic the cost of maintaining the existing water-bound macadam roads now exceeds three thousand pesos per kilometer per annum which would fully justify the cost of hard surface pavements. While it has been possible to construct short experimental sections of such pavements, the solution of this problem seems to lie in adopting a definite program of reconstruction to be financed in the case of most provinces by bond issues. The following tables show the cost of road maintenance by provinces during 1926 and the average for all provinces during the past five years:

In addition to the regular maintenance work, improvements



End of Concrete Section Iloilo-Jaro Road, Iloilo Province

were made on many sections of old roads which carry heavy traffic, including the widening of roadbeds, culverts and bridges, eliminating sharp curves and replacing temporary structures with permanent ones. In Rizal Province 4.29 kilometres of main traveled roads through towns were reconstructed with asphalt macadam and in Iloilo Province the old water-bound macadam road from Iloilo to Jaro was replaced with 1 kilometer of asphalt pavement and 1.7 kilometers of asphalt pavement.

The hard surface pavements thus far constructed have fully demonstrated the advantages of this type of construction not only from the standpoint of durability and low maintenance cost but as a means of eliminating the dust nuisance.

In view of the limited amount of funds available for this purpose, an effort is being made in most of the provinces to have at least a surface treatment of asphalt applied to sections of important roads through towns until such time as available funds will permit a better type of construction.

The standard road direction and warning signs, adopted during 1925, were placed on all the more important roads during the year.

The following are the important road construction projects undertaken during the year:

Cagayan Valley Road, Nueva Ecija Province.—The section under construction in the Province of Nueva Ecija is known as the San Jose-Santa Fe Road and is 58 kilometers in length. During 1926, 4,220 linear meters of subgrade were widened to a 6-meter roadway between Km. 190 and Km. 195, and 3,000 linear meters widened between Km. 201 and Km. 204 and a contract awarded for the widening of the section from Km. 196 to Km. 199. This work exhausted the total appropriation of P.58,032.15. The status of construction at the close of the year was: first class, 25 kilometers; second class, 6-meter subgrade, 15 kilometers; and third class, 4-meter subgrade, 18 kilometers. Total expenditures to December 31, 1926, was P.1,316,812.21. This expenditure includes the cost of constructing the Kabolinaoan River Bridge consisting of three 12-meter spans, reinforced concrete slab and girder type on concrete piers and abutments, and the Digdig Bridge, consisting of one 48.77 meter steel truss span and two 8-meter approach spans, reinforced concrete slab and girder type on concrete piers and abutments. The cost of these two bridges was P.24,500 and P.60,191, respectively.

Cagayan Valley Road, Nueva Vizcaya Province.—The section under construction in the Province of Nueva Vizcaya is known as the Bayombong-Santa Fe Road. The following work was accomplished: 4,840 linear meters between Km. 258 and Km. 263 and 4,640 linear meters between Km. 233 and



Km. 605, Bangui—Claveria Inter-Provincial Road, Ilocos Norte Province (Under Construction)

Km. 238, were built first class; the subgrade on the following sections was widened to a 6-meter roadway; Km. 220.06 to Km. 220.59, Km. 221.10 to Km. 221.845, Km. 222.96 to Km. 224.60 and Km. 226.24 to Km. 226.44, giving a total of 3,115 linear meters of completed subgrade. This work cost P.45,172.70.

With the completion of the remaining 2.32 kilometers of the Bayombong-San Luis Section of this road during the year, the entire section from Bayombong to the boundary of Isabela Province has now become a first-class road. The amount of P.19,515.71 was expended on the 2.32 Kilometers.

Cagayan Valley Road, Isabela Province.—Construction work was largely confined to the Cauayan-Ilagan Section, 33 Kilometers long, the work accomplished comprised the completion of the subgrade, the construction of temporary bridges and the surfacing 16 kilometers of road. This work exhausted the total appropriation of P.94,081.84 available for 1926.

Cagayan Valley Road, Cagayan Province.—The work consisted in completing the subgrade work between Cattarian and Lal-lo, including the rocky section at Magapit. The entire subgrade from Alcala to Lal-lo, 44 kilometers in length including the construction of wooden bridges, was completed last November, thus making the entire section passable for automobile traffic. It is now possible to motor from Manila to Aparri, a total distance of approximately 575 kilometers. The average cost for building the subgrade ranged from P.0.55 to P.0.66 per cubic meter of material moved. The work was done by the "paquiao" system.

Bataan-Zambales Interprovincial Road.—On account of the limited funds available, only a trail 1.5 meters wide was constructed in Bataan Province. The trail follows the approved road location so that it can later be widened to the standard width required for a first-class road, when more funds are provided. During the year 9 kilometers of trail were opened at a total cost of P. 15,692.84.

In Zambales Province, the construction of this road was started at Subic and 2,000 linear meters of subgrade were completed between Subic and Olongapo at a cost of P. 9,244.

Tarlac-Camiling Road, Tarlac Province.—This road is a part of the Tarlac-Pangasinan Interprovincial Road. The Tarlac-Nambalan Section is 21.67 kilometers long and the subgrade was completed in May, 1926. This permitted direct traffic during the dry season between Tarlac and Camiling, a distance of 34 kilometers, where the former route *via* Bayambang, Bautista, and Rosales required approximately 3½ hours by automobile to cover a total distance of 108 kilometers. The expenditure during the year was P.34,303.

Burgos-Dasol-Infanta Road, Pangasinan Province.—This is the connecting link on the Pangasinan side of the Pangasinan-Zambales Interprovincial Road. The distance is about 40 kilometers from Burgos to the boundary between the two provinces, 9 kilometers of which have already been declared first class. The work done during the year consisted in constructing 3 more kilometers of first-class road and 2 kilometers of subgrade. The amount spent was P.25,334.25.

Bongabong-Baler Trail.—This trail will provide an overland connection between Nueva Ecija and the east coast of Luzon, and will eventually be converted into a second-class road. From Bongabong to the Tayabas boundary the distance is 30 kilometers and from the boundary to Baler it is 75 kilometers. The survey was completed and 6 kilometers of subgrade 4 meters wide built in Nueva Ecija during the year. The amount expended was P.13,291.77.

Cabanatuan-Bongabong Road, Nueva Ecija Province.—This road is a section of the Interprovincial Road to Tayabas Province. Four kilometers were declared first class during the year. The amount spent was P.20,004.40.

Camarines Sur-Camarines Norte Interprovincial Road.—The necessary investigations and surveys were completed during the year but very little construction work accomplished. This road is approximately 80 kilometers long and when completed will open up large tracts of rich agricultural land and provide an overland outlet for Camarines Norte.

Tanauan-Alaminos Road.—This road will connect the town of Tanauan in Batangas with the town of Alaminos in Laguna. It is 7.36 kilometers long and during the year 3.82 kilometers of subgrade were constructed. The cost, including the delivery of the surfacing material, was P. 8,363.04.

Baybay-Abuyog Road, Leyte Province.—This is a very important project and has been under construction since 1918. It passes through one of the richest hemp regions of the province and will connect the east and west coasts of the island. The total length of the completed road will be 51 kilometers. To date, 7.4 kilometers

have been constructed as a first-class road and 21 kilometers as a trail, 5 kilometers of which were constructed during 1926 at a cost of P. 20,600.37.

Ormoc-Capoccan-Carigara Road, Leyte Province.—This is another important road in Leyte to connect the north coast with the west coast, passing through an undeveloped agricultural country. Twelve and eight-tenths kilometers have been graded, two of which have been surfaced. The amount of P. 10,917.16 was spent during 1926.

Loay-Interior Road, Bohol Province.—This important road will connect the north and south coasts of the island of Bohol, passing through the center of the island. The road for a distance of 50.6 kilometers extending from Loay on the southern coast to the Government Agricultural Colony, has been declared first class. During the year the road location was completed from the Colony to the north coast, a distance of 24.86 kilometers and the location plan approved.

Carmen-Bacani Road, Bohol Province.—This is another important road in Bohol which will eventually connect the west and east coasts, intersecting the Loay-Interior Road at the town of Carmen near the center of the island. Twenty-eight and four-tenths kilometers have been declared first class, six of which were completed during 1926.

Iloilo-Antique Interprovincial Road.—This road, which is the only land connection between the Provinces of Iloilo and Antique, has been practically completed. It is 23.35 kilometers long, of which 12.25 kilometers are within the Province of Iloilo and 11.1 kilometers in Antique.

Tambungan-Gandara or Catbalogan-North Road, Samar Province.—This is by far the most important road project on the island of Samar since it will connect the completed roads in the Calbayog district with the capital of the province. Twenty-one and seven-tenths kilometers still remain to be constructed. During 1926, 3.1 kilometers of subgrade and 2.2 kilometers of surfacing on the Calbayog end and 3 kilometers of surfacing on the Catbalogan end were completed.

Catbalogan-Wright-Taft Road, Samar Province.—This road will connect the east coast of the island with the west coast at Catbalogan, the capital of the province. The 3-meter trail between Catbalogan and Wright was widened to a 7-meter roadway and the final location survey between Wright and the barrio of Loquilocon completed during the year. From barrio Loquilocon, it is possible to travel by "baroto," down a large river to the Pacific coast. The section of the road from Catbalogan to the barrio of Loquilocon is therefore considered the more important and will be completed before starting construction beyond this point.

Calapan-Pinamalayan Road, Mindoro Province.—This important road is 69 kilometers long, and will connect the town of Pinamalayan with the capital. On the Pinamalayan side 10.2 kilometers have been graded, 7.7 kilometers of which were surfaced during the year. On the Calapan side 24 kilometers have been completed, 9 kilometers of which were accomplished during the year. The expenditure for this work amounted to P. 70,265.85.

American Submarines for Japan?

THE announcement was made last month that the Electric Boat Company had been awarded a contract by the Japanese Government for the construction of forty submarines and equipment. The order, one of the largest ever placed, called for \$80,000,000 in submarines and \$5,000,000 in periscopes and will take over two years to complete. It was said that owing to the period of mourning for the late Emperor, the official announcement has been withheld by the Japanese Government. The Electric Boat Company owns two plants at Bayonne, N. J., and one at Groton, Conn., and has agreements with prominent shipbuilding concerns in all parts of the world by which it is able to build the boats at any place most agreeable to the customer, which has led to speculation over the yards to be selected for constructing the Japanese submarines.

The report which appeared in all the New York newspapers was immediately denied by the Japanese Ambassador in Washington, who pointed out that such a contract would have to be provided for in appropriation bills by the Japanese Parliament, and no such appropriations had been made to his knowledge.

Engineering Notes

Dai Nihon Jinzo Hiryo K.K.—The factory building of the new nitrogen mill planned near Toyama City has been nearly completed and the machinery is now being installed, under the supervision of an Italian engineer. The whole construction is expected to be finished early next year and the products may appear on the market before the end of March. The productive capacity of this mill is reported at 25,000 tons of sulphates of ammonia a year.

Osaka Kikai Kosakujo.—Due to the replanning of city sections in Osaka, the Osaka Kikai Kosakujo (Osaka Machinery Works, Ltd.) will remove its plants to somewhere near Wada. The company is now negotiating for the purchase of a site occupying an area of some 20,000 tsubo, which is about four times the present site. It is reported that the spindle department and loom department will be extended on a large scale at this opportunity, in which case the company will become the largest maker in those lines in Japan.

Niigata Denki K.K.—License has just been granted for the sale of the water power owned by the Takata Kogyo K.K. (Takata Mining Co.) for the power station now under construction at Choko Mura, Minami Aidzu Gun, Fukushima Prefecture. The site is located on O River, a tributary of Aka River. The capacity of the station is reported to be 6,630 kw., flow 300 c. ft. per second. The construction will be taken over by Niigata Denki immediately, to be completed before the end of 1928, a year earlier than the original plan.

Nippon Denryoku K. K.—It is reported that this company's new transmission line between the Kurobe sub-station and Sasagu sub-station, 154,000 volts, which is strung *via* the Uchiyama Switch Station, is now nearly completed. When this is finished and the Main Transmission Line to Tokyo is ready, the transmission system between Osaka and Tokyo, about 400 miles *via* the Kurobe River Plants, will be complete, and power may be switched to either of these districts to the company's great advantage.

In the Tokyo district the frequency is 50 cycles, while in Osaka it is 60 cycles. The Yanagawara Hydro-electric Power Station of this company is equipped with both 50 and 60 cycle frequency changers, so that power can be shifted in either direction.

The Kanidera Hydro-electric Power Station is also equipped with frequency changers, so that power from this source can be utilized to make good any deficiency from the Sasazu sub-station.

In addition the company expects to complete the Komaki Station on the Sho River in the near future, adding another 72,000 kw. to its already large amount of undigested power resources.

Distribution of Railways and Tramways in Japan.—According to the "*Kogyo Shimbun*," the mileage of governmental and private railways and tramways now in operation in Japan works out at 0.5 mile per one square ri (about 5.8 square miles) and at 2.17 miles per 10,000 of population. The mileage in different districts of the country as of the end of 1926 is summarized by the "*Kogyo*" as follows:

District	Governmental Railway	Local Railway	Tramway
	miles	miles	miles
Hokkaido	1,497.9	278.5	62.0
Tohoku	1,392.0	191.2	181.2
Kwantou	974.5	627.7	399.3
Hokuriku	595.8	292.7	54.5
Tosan	380.0	321.7	100.4
Tokai	460.3	486.7	148.2
Kinki	644.4	324.2	305.5
Chugoku	758.8	303.1	36.7
Kyushu	1,090.0	342.0	390.3
Chikoku	229.5	123.2	41.3
Okinawa	—	29.6	21.1
	7,993.2	3,320.6	1,640.5

Sunmatagawa Water Right May go to Fuji Denryoku.—The water right on the Sunmata River, tributary of Oi River, in Shidzuoka Prefecture, for which many interests have been applying for license, including Shidzuoka City, Tokyo Denryoku and Fuji Denryoku, as likely to be granted to the Fuji Denryoku K.K. which plans to develop a total of 50,000 kw. as compared with 20,000 kw. of Shidzuoka City and 100,000 kw. of Tokyo Denryoku. This latter company has water rights still undeveloped on the Tenryu River, Sukawa River, etc. and the preference that may be given to Fuji Denryoku is attributed to this fact.

Mulin-Hwachwan Gold Mining Company.—The Mulin-Hwachwan Gold Mining Company has been promoted by a group of private capitalists to work the gold mines at Mulin and Hwachwan in the north-eastern part of Kirin province. The company has an authorized capital of \$400,000, divided into 4,000 shares of \$100 each, of which \$200,000 are Government shares, represented by the mining concessions at Liangtzehe and Chiupikou Mulin, and Tai-pinglin and Liumaoho Hwachwan. The company was officially recognized in April this year and its head office has been established at Makiaoho, a station on the Chinese Eastern Railway. A mining office has been opened at Liangtzehe. According to the program of the company mining operations will start at Liangtzehe and then at Chiupikou. If the results warrant further extension, the mines at the other two places at Hwachwan will also be worked.

Nitrogen Fixation in Japan.—It is understood that the method to be adopted by the Japanese Government for subsidising the fertiliser industry will be to apply the new electricity legislation to the fertiliser companies, allowing them, like the power companies, to issue debentures to an amount double their paid-up capital. Machinery necessary to equip their plants would be exempted from import duties. The Government would also directly subsidise the companies and engage foreign technical experts, the subsidies to be based on the amount of power used by each concern. An Atmospheric Fertiliser Syndicate would be formed and the Government would lend it low interest funds to the extent of 50,000,000 dollars. The Government would have the right to supervise the manufacture of ammonium sulphate by the Syndicate, establish a Fertiliser Bureau, and fix the market price.

Conservancy of the Hai Ho.—A detailed program for conservancy of the Hai Ho River outlined by the Metropolitan River Conservancy Commission is now before the Government. The silting-up of the river bed has seriously impeded shipping, and steamers of any draft are no longer able to reach Tientsin but have to discharge cargo into lighters at Tangku, thereby greatly increasing costs for loading and unloading and adding to the risk of losses and breakage. At low tide the water in the channel near the Tientsin wharves falls so low that heavy-laden junks find it difficult to move freely. Even at high tide steamers drawing over ten feet of water can scarcely pass through the channel.

The question of deepening the Hai Ho channel is engaging the serious attention of the Ministry of the Interior, under whose auspices conferences have been held to discuss the measures which should be adopted. According to a memorandum submitted by one of the experts on the Metropolitan River Conservancy Commission, the silting-up of the channel has been caused chiefly by the sand and mud brought down by the Yung Ting River, which discharges its water into the Hai Ho through a section of the Grand Canal north of Tientsin. One of the plans suggested is to divert a portion of the water from the Yung Ting River by digging a canal to connect the Grand Canal in the neighborhood of Peitsang with the Ching Chung River so that a large proportion of the silt-laden waters of the Yung Ting River can be diverted to the sea in the neighborhood of Peitsang through the Ching Chung River by means of a movable lock. This, however, would be only a temporary expedient, but could be carried out by an estimated expenditure of \$2,000,000. A permanent and more effective plan has also been suggested, the execution of which would cost over \$3,000,000.

Tientsin-Paoti Motor Service.—The motor service between Tientsin and Paoti, Chihli province, started operation on October 11.

Shanghai-Nanking Telephone Service.—The long distance telephone service between Shanghai and Nanking has been successfully installed and operation has started since October 18.

Tientsin-Harbin Long-distance Telephone.—The authorities are planning an extension of the long-distance telephone service between Tientsin and Mukden to Kirin and further to Harbin. Construction work is expected to begin before long.

Tahushan-Tungliaochen Railway Constructed.—Construction of the Tahushan-Tungliaochen Railway was completed on October 15. Traffic on the line will be open on November 1.

Yuen Yun Steamship Co., Ltd.—The Yuen Yun Steamship Co., Ltd. with offices at No. 66 Rue Laguerre, French Concession, Shanghai, is in process of formation for the transportation of goods along the Yangtze river. It is capitalized at \$500,000. The general manager is Wu Chung-lien.

Mukden-Hailung Railway to Build Branch Line.—The Mukden-Hailung Railway Administration plans to build a branch from the vicinity of Yingpan to Hingking, Fengtien province. The line is 127 *li* in length and will cost \$4,000,000. Surveying work on this line has already been completed.

Lighter Company in Tientsin.—In view of the silting up of the Hai Ho some Tientsin merchants are organizing the Shen Hsing Lighter Co. for conveying cargo between Tientsin and Tangku. The company owns more than eighty lighters, registered with the local Customs House.

Commercial Aviation between China and Japan.—The Aviation Company of Kobe, Japan, has appointed a delegate to approach the Peking authorities regarding the establishment of air services between Kobe and Dairen and Kobe and Shanghai for carrying passengers and mail. The Chinese Government is reported to have agreed in principle to the terms proposed by the Japanese.

Fukubu Denki Tetsudo K.K.—License for construction of railway has been granted to the Fukubu Denki Tetsudo K.K. (Fukubu Electric Railway Co., Ltd.) for a distance of 1 mile 14 chains between Kida Mura, Asuha Gun, Fukui Prefecture and Idzushimo Machi, Fukui City, gauge 3 feet 6 inches. The cost of construction is estimated at a total of Y. 400,000.

Kuji Iron Works.—It is reported that the Kawasaki Shipbuilding Works has succeeded in manufacturing black sheets from the sponge iron made at the Kuji Iron Works and submitted to Kawasaki for experiment. The quality of the new thin sheets is said to compare favorably with European and American makes.

Factory Electrification Planned by Big Company in Osaka.—It is reported that the electrification of factories is being planned by some big manufacturing company in Osaka (name unknown) and that the company is already in negotiation with some electric power companies for joint investigation of the plan. Details are not yet known, but the project when carried out will involve 45,000 kw. of electric power, it is rumored.

Ujigawa Denki K.K.—When the new Kizugawa Steam Power Station of the Ujigawa Denki K.K. is opened, the company will shut down the Fukuzaki station, and will reduce the power purchase from Daido Denryoku K.K. to minimum amount of the contract.

At the end of the year, the demand is expected to increase, therefore the additional 60,000 kw. generated at Kizugawa will be easily sold.

Chefoo-Weihsien Motor Road.—The management of the motor road and motor bus service between Chefoo and Weihsien, Shantung province, hitherto under the control of a company organized by merchants, has been taken over by the provincial government. The company has made a handsome profit during the past few years.

Odawara Kyuko Tetsudo K.K.—(Odawara Express Railway Co., Ltd.) The double track of line between Noto and Odawara has been completed recently and will be put into operation, pending permission of the Department of Railways. This will shorten the time required between Tokyo and Odawara to 1 hour and 45 minutes which the company will gradually endeavor to shorten to 80 minutes.

Harbin Tramway Opened to Traffic.—A portion of the tramway of Harbin, one and two-thirds of a mile in length, was opened to traffic on October 10. Construction of the tramway was started six years ago by a company organized by Kirin merchants and was later taken over by the Kirin provincial government. Building of the tramway and power station and the purchase of cars has cost some seven million dollars, Kirin currency, advanced by the Yung Heng Official Bank.

Black Sheet Rolling Mill.—It is reported that equipment for a new Black Sheet Rolling Mill planned by Mr. Etsujiro Nakayama has been ordered from the Tobata Imono K. K. (Tobata Casting Company, Ltd., after competition with Landgraf (agents for Krupp) and another foreign maker represented by Illies and Company. The equipment includes one rolling mill unit, two finishing machine units and one cold rolling unit, total capacity 15,000 tons a year. The factory is to be put into production before the end of June next year.

Fuji Denryoku K.K.—(Fuji Electric Power Co., Ltd.) Established by taking over the electric department of Fuji Gasu Boseki K.K. (Fuji Gassed Spinning Co., Ltd.), with a capital of Y.25,000,000, paid in capital Y.6,250,000, on May 26, 1927. The first six month term of the new company will close at the end of November this year.

The present generating capacity of the company is as follows :

Hydro —	Urushida	1,500 kw.	
	Mine	5,000 ..	
	Sukawa	5,250 ..	
	Yamakita	6,450 ..	
	Uchiyama	3,900 ..	All located in Hakone Mountains
	Arashi	4,300 ..	
	Suganuma	6,000 ..	
		31,900 kw.	
Steam —	Hodogaya	2,000 ..	
		33,900 kw.	

This is the rated capacity and actual amount in operation most of the time may be estimated at 25,000 kw., of which 10,000 kw. is supplied to the Fuji Gasu Boseki K.K., 5,000 kw. to Tokyo Dento, and remaining 10,000 kw. transmitted to Tokyo District to be supplied to Tamagawa Denki Tetsudo, Ajinomoto Factory, Nippon Kokan K.K. (Japan Steel Pipe Co., Ltd.), etc. Charges to Tokyo Dento are about Y.125 a kilowatt a year; to Tamagawa Denki Tetsudo and others about 2 sen per kw.h.; to Fuji Gasu Boseki the rate is a little lower but profit greater as power is supplied day and night and the power stations are located in the factory compound.

The total revenues for a term may be estimated at Y.1,400,000, minus estimated expenditure of Y.350,000, balance of Y.1,050,000 profit, minus interest on loans, at 7 per cent. on the Y.19,000,000, payable to Fuji Gasu Boseki for purchase of business or Y.665,000 a term, giving a net profit balance of about Y.380,000 at the rate of 12 per cent. against the paid-in capital.

The equipment of Fuji Denryoku is estimated at Y.25,000,000 total, including 66,000 volt transmission lines of 73 miles and distribution lines of 77 miles; electric lights installed about 10,000. The cost of one kilowatt generating capacity works out at about Y.700, which is comparatively high. This was carried on the books of Fuji Gasu Boseki at Y.14,000,000, to which a profit of Y.11,000,000 was added by revaluation before the sale was effected.

Komaki Power Station of Shokawa Denryoku.—Actual construction work on the Komaki Power Station of the Shokawa Denryoku is still being delayed by disputes involving fishing and lumber rafting on the river to be used by the station. The machinery ordered is now beginning to arrive in Japan and complete delivery is expected before the end of the year. Although these orders were placed some time ago, we give a list of the main installations as follows :

Generators, Main,	Two Units	20,000 kw each	General Electric.
Generators, Main,	Two Units	20,000 kw each	Brown, Boveri,
Water Turbines,	Two Units	31,000 h.p.	I.P. Morris,
Water Turbines,	Two Units	31,000 h.p.	Escher-Wyss.
Transformers,	Seven Units	13,333 kw each	Shibaura,
Oil Switches,	Three Units	154,000 kva	Hidachi
Oil Switches,	Four Units	66,000 kva	Mitsubishi.

Electric Power in Niigata Prefecture.—The Prefectural authorities of Niigata report the potential hydro-electric resources of that Prefecture to be capable of generating a total of 689,790 kw. Of this 162,847 kw. have been developed.

Developments planned, the under construction include the Shinano River scheme of the Imperial Government Railways, which is to provide a potential maximum of 280,000 kw. some day.

According to Rivers : the power potentialities are as follows :

River	Completed developments	Potential Resources Remaining
Shinano.. ..	89,305 kw.	285,080 kw.
Agano	11,170	97,067
Kaji	4,115	1,000
Hime	12,138	15,050
Other Rivers	5,898	9,205
Total	123,626	407,402

Our source of information adds these two figures together and gets a Grand Total of 689,794 kw. Our addition figures out at 531,028 kw. leaving about 158,000 kw. unaccounted for. Unfortunately we have no figures with which to check this discrepancy, for which *Denki Nippo* is responsible.

Automatic Station of Tokyo Dento Nears Completion.—The Matsudome Jido Hatsudensho (Matsudome Automatic Power Station) of the Tokyo Dento K.K., located on the Matura River, capacity 1,600 kw. is to be completed in the near future. Equipment includes Escher-Wyss turbines, and generators and switching apparatus by Okumura Denki K. K. The station will utilize the discharge water from the Yazawa Station located a few hundred yards further upstream. The effective head will be 18 feet, and speed of turbine 107 r.p.m.

First Railless Tramway Licensed.—The Department of Home Affairs has granted the application of the Hanayashiki Onsen Tochi K.K. (Hanayashiki Hot Spring Real Estate Company, Ltd.) to build a railless tramway line. Construction and operation of the line will be undertaken by the Shin Hanayashiki Onsen Tochi K. K., Office at Kirihata Nishitani Oura, Kawanabe Machi, Hyogo Prefecture. The capital of this company is Y.120,000.

The proposed line will start at Kasai Mura, Kawanabe Machi and will terminate at Kirihata Nishitani Mura, a distance of 1,452 meters. The width of the cars is limited to 6 feet.

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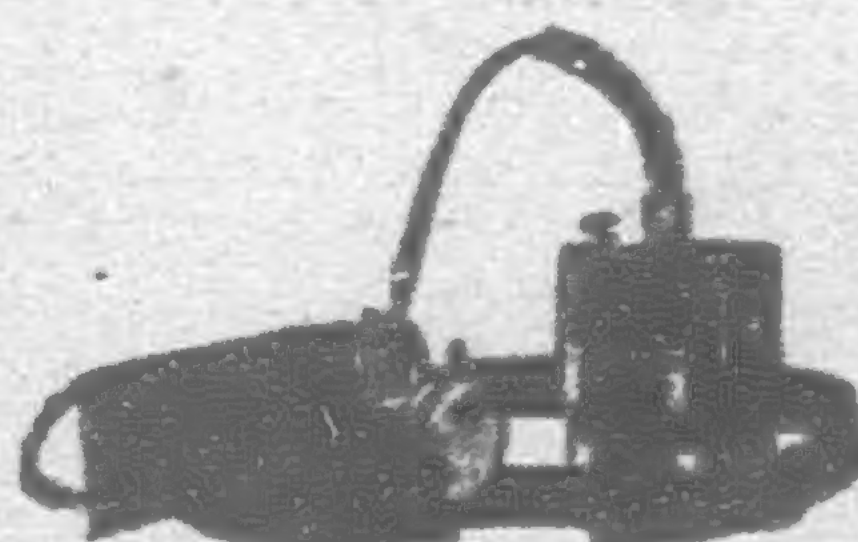
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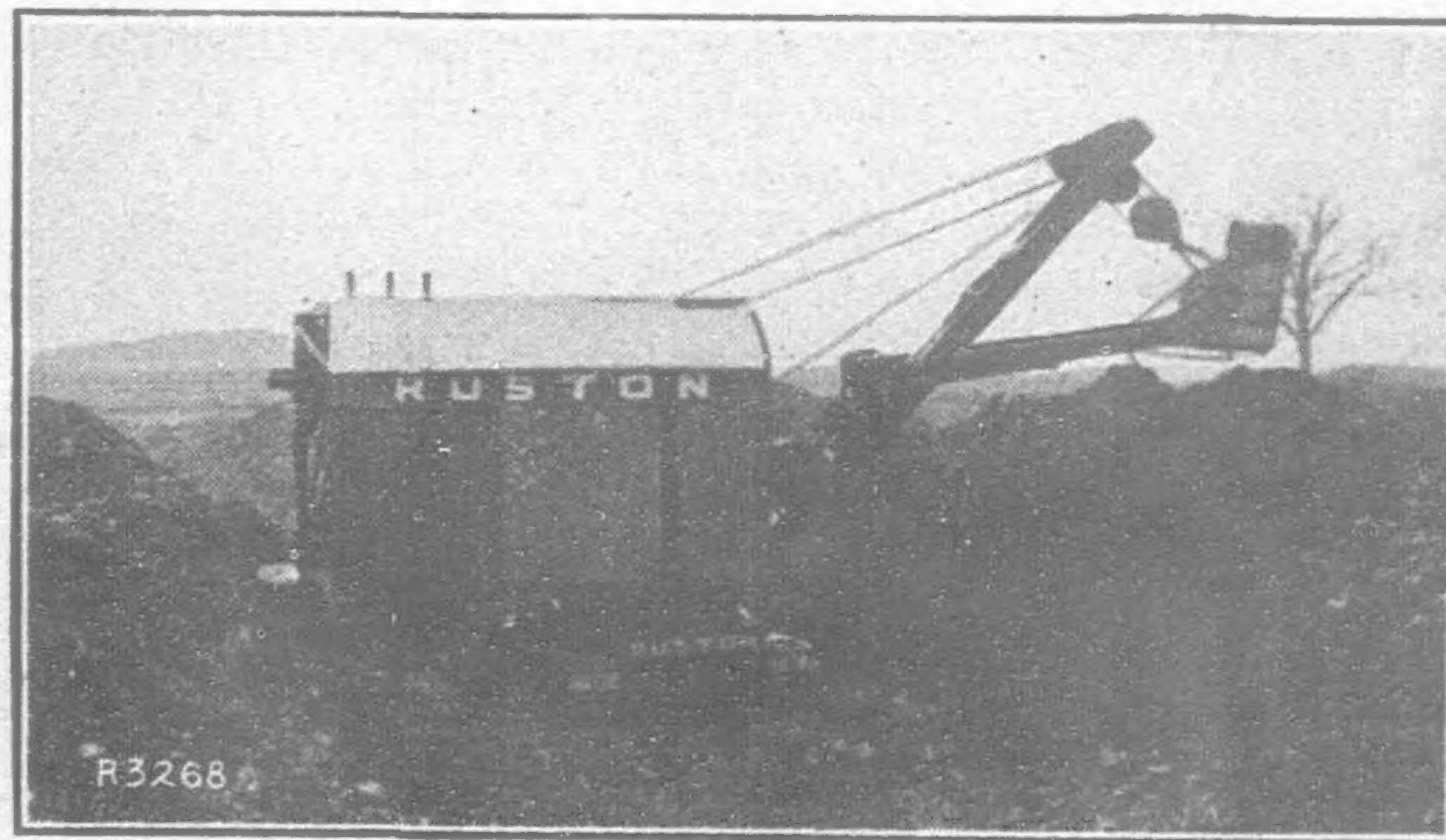
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